

62728/B

MEDICAL SOCIETY
OF LONDON



ACCESSION NUMBER

PRESS MARK

LATHAM, P.M.

(Vol.2.)

LECTURES
ON
SUBJECTS CONNECTED WITH
CLINICAL MEDICINE.
VOL. II.

LONDON:
Printed by A. SPOTTISWOODE,
New-Street-Square.

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L E C T U R E S

ON

SUBJECTS CONNECTED WITH

CLINICAL MEDICINE,

COMPRISING

DISEASES OF THE HEART.

BY

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IN TWO VOLUMES.

VOL. II.

LONDON :

PRINTED FOR

LONGMAN, BROWN, GREEN, AND LONGMANS,

PATERNOSTER-ROW.

1846.

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LECTURES

ON

SUBJECTS CONNECTED WITH

CLINICAL MEDICINE.

THE HEART.

LECTURE XVIII.

IMMEDIATE RESULTS OF ENDOCARDITIS AND PERICARDITIS.— REPARATION OF THE INJURY DONE TO THE HEART.— PERFECT AND IMPERFECT.— THOUGH IMPERFECT, IT MAY SAVE LIFE. — CAUSES WHICH HINDER OR POSTPONE REPARATION : 1. THE AMOUNT OF INJURY TO THE HEART ITSELF ; 2. THE AMOUNT OF CONCOMITANT INJURY TO OTHER ORGANS ; 3. ORIGINAL WEAKNESS, OR PRAVITY OF CONSTITUTION. — ALLUSION TO CERTAIN AFFECTIONS OF THE BRAIN AND SPINAL MARROW INCIDENT TO THE PERIOD OF REPARATION.

OUR attention has thus far been occupied with acute inflammation of the heart, as it is found in those structures of the organ which are its most frequent seat ; and we have dwelt especially upon

its clinical diagnosis, and its clinical history, and its medical treatment.

Its clinical diagnosis is, perhaps, as nearly perfect as it is possible to conceive of any internal disease. The fact of its existence, even as soon as it begins to exist, and the discrimination of its exact seat, whether in the endocardium or the pericardium, are brought to an almost certain calculation.

Its clinical history is less perfect than its clinical diagnosis; but it will probably be enlarged by future research, teaching us more of the conditions, both external and internal, which conduce to it. What, however, it has already disclosed is most valuable. It has shown that endocarditis and pericarditis are no isolated pathological facts, but that they claim a natural alliance with well-known forms of disease in other parts of the body, and in the constitution at large.

Its medical treatment can hardly be thought to have reached all the certainty and success of which it is capable. But, so far as it is successful, it claims for endocarditis and pericarditis (not less than their clinical history claims for them) a common pathology with inflammation in all other parts, showing that they both need and bear the same remedies, and that they admit from them the same impressions, whether for palliation or for cure.

From what, then, has hitherto been seen of

diseases of the heart, it will appear how far they stand alone, and how far they do not. They stand alone in the forms and modes of their manifestation, but in their essence they have a pathological unity and a common principle of treatment with the diseases of other parts; they owe their exclusive forms and modes of manifestation to the structure and functions and sensibilities proper to the heart, of which no other organ in the body has the like: they owe their unity of essence and their common principle of treatment to the one vascular system, the one nervous system, and the one nutrient and assimilative system, which belong to the heart as they do to all other organs, and which carry on the work of health and the work of disease there and every where.

These are truths too well known to be dwelt upon. I only here set them up as cautionary notices, while we still pursue our inquiry into diseases of the heart, not to lose the links connecting them with those of every other organ of the body.

Of acute endocarditis and pericarditis, under the circumstances in which alone we have any familiar experience of their occurrence, viz. in connection with rheumatism, the fatal cases were few; but the cases of perfect recovery, as far as our observation reached, were few also. Of ninety cases, death took place in three only. But of the rest it was only in seventeen that we could

feel any thing like an assurance of perfect recovery.

What, then, became of the seventy cases which remained? The patients were kept in the hospital until they had reached, it was thought, a state of present security; and then they were discharged, and lost sight of altogether; believed to be safe but known not to be sound.

Our acquaintance with the seventy cases in question ceased at a most interesting point. The most vital organ in the body had suffered inflammation. The inflammation was gone, but the organ was still damaged. Life was safe, but recovery was imperfect. This, I say, was a most interesting point, whether we looked from it backward or forward. In some we had good reason for gratulation, in some for disappointment. Looking backwards upon all the fears we had of the severer cases, we were content that life was merely safe when we expected death: and looking backward upon all the hopes we had of the milder cases, we were dissatisfied that life was merely safe when we expected complete recovery. And now in all, safe as they were for the present, looking forward and thinking what was to become of them, we found them invested with a new interest prospectively; and at this point of new interest we lost sight of them. The poor patients remained under our observation and care for the longest period that the regulations of the hospital

would allow, and then they returned to their customary occupations, whatever they might be, and followed them as best they could.

What may be the ultimate fate of these cases will serve for our speculation hereafter. The fact of their present safety is momentous enough to have a little further consideration now bestowed upon it.

This state of present safety was sometimes easily and quickly reached, and sometimes hardly and slowly; and the process of reparation conducting to it was full of eventful circumstances.

But what is reparation? It is neither health nor disease; but it stands midway between them, and partakes of the nature of both. Now it is nearer to one, and now to the other; now ready to fall back into disease, and now to go forward into health. Truly this reparation demands as much of the physician's care as either of the other two; for it has its aids and its hindrances, which it is our business to study and to interpret; its aids, that we may apply them and cherish them, and in every way make the most of them; its hindrances, that we may intercept them or lessen them or counteract or annul them altogether.

Unquestionably it does often happen, even when vital organs are concerned and inflammation has materially injured their structure, that, as soon as it is fairly arrested, the patient is safe for the present. There may yet remain a great deal to

be done before he is either entirely well, or as well as he ever will be; but already there is no anxiety about his life. On the other hand, it often happens, when vital organs are concerned, and a material injury is done, that though the inflammation have come to an end, life is still in jeopardy. It is not enough that the disease, as an active, moving, mischief-working process, have ceased, reparation has to take its place, and to make some real progress before the patient is safe from day to day.

Inflammation of the heart in its several forms furnishes examples of both these issues, and happily of one much oftener than of the other. Simple endocarditis is by far its most frequent form: and of simple endocarditis the cases in which the danger, whatever it has been during its progress, entirely passes away when the inflammation ceases, are the vast majority, and those in which it remains are the very few. But of simple pericarditis, and of pericarditis combined with endocarditis, the cases in which the danger passes away are the few, and those in which it remains are the many.

Seldom to endocarditis, oftener to pericarditis, and very often to the complex of both, there succeeds an interval of days, or of weeks, even of many weeks, during which it is still doubtful whether the patient will live or die.

Now there is no more obvious and intelligible

cause of life being left or not left in a state of present safety, or near to it or far from it, than the mere *amount* of damage done to the heart by the by-gone inflammation. After the subsidence of simple endocarditis, the endocardial murmur will often remain as loud or louder than ever, showing that the damage done continues, while at the same time there is no other attendant condition which denotes the smallest danger. Surely in such cases there is reason to believe that the damage is small, consisting in those little beads of lymph deposited upon the free edge of a valve, which dissection discloses as the effect of acute inflammation. And, though there be no reparation of this small damage either now, or for weeks or months to come, life in the mean time is perfectly safe. No doubt from the valvular unsoundness produced by endocardial inflammation, though small in degree, there *is* a danger, but it is not yet; and it is for the sake of preventing this remote danger that its perfect reparation, small as it is, is especially desirable, and not for the sake of present safety.

But, after the subsidence of simple endocarditis, the murmur which remains will in rarer cases be accompanied by conditions that bespeak danger, by excess of impulse and by præcordial fluttering and by extreme anguish. And here it may be believed that a greater damage has taken place. For acute inflammation of the endo-

cardium can do more than deposit specks of lymph upon the edges of a valve; it can spread a layer of lymph over a great superficial extent, even (as I have seen) throughout an entire auricle; it can accumulate masses of lymph as large as a pea or a cherry-stone, or larger, and leave them pendulous into the cavity of the ventricle; or it can destroy half a valve by ulceration, or carry away a long strip of the membrane, and lay bare the muscular substance; or, (as I have known,) it can penetrate from one auricle to the other, and lay them both together. Here are some forms of injury too destructive to admit any such degree of reparation as will allow life to go on at all; and here are others not destructive enough to make such reparation altogether impossible, but only capable of it slowly, and likely to keep life in jeopardy until it is accomplished.

Acute pericarditis being more frequently fatal than endocarditis, dissection has made us more familiar with the nature of the organic injuries which immediately follow it. Their forms and degrees are quite enough to account for the many various events familiar to clinical observation. There is that organic injury which is too great to be borne, and which must kill at once, and there is that which is too small to bring life into any present hazard. In one case there is no surviving it, the injury is so great, and in another there is no dying of it, the injury is so small.

And as in pericarditis there are many degrees of organic injury lying between the greatest and the least disclosed by morbid anatomy, so between present death and present safety there are degrees and vicissitudes of suffering, known to clinical observation, which may come sometimes nearer to one, and sometimes nearer to the other.

Now some clear notion of the real detriment done by pericarditis, and of the much or the little that remains to be repaired is needed to help us in understanding what its reparation must be as a living process, and why it is so difficult and so precarious in some cases, and so easy and so sure in others. Coagulable lymph adhering to the surface of the pericardium, and fluid effused into its cavity, each of various amount and of various relative proportions in several instances, constitute the material results of recent acute inflammation. The coagulable lymph adhering to the surface may be deposited in distinct and broken patches, or it may assume the form of an adventitious membrane. The adventitious membrane may cover a small portion only of the pericardium, or it may serve as a complete lining to it, following its reflections both where it is loose and over the heart itself and over the large blood-vessels.

This lymph varies in consistence, from the least possible degree of tenuity, which can preserve a continuous texture, to the thickness of

more than an inch. On one side, where it is applied to the pericardium, its surface is uniform; on the other it varies. Sometimes this latter is dotted all over with minute apertures or pores at regular distances, which give it a reticulated appearance, like delicate net-work. Sometimes it is intersected with lineal elevations, forming a grosser reticulation, not unlike the second stomach of the calf. Sometimes it is studded with minute tubercles; and sometimes rendered rough and very unequal by partial accumulations of soft flocculent matter upon it, like large pieces of sponge, or tow.

From the slight red tinge often observed in this adventitious membrane, it might be suspected that blood-vessels are continued into it from the pericardium. From its capacity of receiving injection from the coronary arteries, it is certain that they are so.

The fluid effused into the cavity of the pericardium in consequence of inflammation, varies very much in quantity: sometimes it does not exceed the quantity of fluid ordinarily found there; but its appearance will always show it to be the product of disease. Nearly four pints are mentioned, upon good authority, as having been found in a case of inflammation. I never found more than half as much. This fluid is sometimes of a clear lemon colour, and transparent; sometimes less transparent, from an in-

termixture of filamentous flaky or membranous substances; and sometimes not at all transparent, but, like unstrained whey, from an intermixture of pus. In different cases it presents every tinge of red, from an intermixture of blood in various proportions, and sometimes it is a mere turbid serum.

Here is detriment enough done to the natural and healthy structure of the pericardium. Here are substances enough superadded to its natural and healthy substance. But even to the eye of the anatomist they bear the characters of transition and variableness, and not of permanency. They contain the evidence of *something in progress*, which death has arrested. Had life continued, either disease would have increased them, or reparation have lessened them. They could not have remained as they are. What death *has* in truth arrested, is either the growing fabric of disease, or the growing work of reparation; for these are the appearances found, when life is cut short, while we are still employing active remedies for active symptoms, the symptoms (we believe) of inflammation. And these too are the appearances found, when active symptoms *have* existed, but are now gone, and active remedies *have* been used but are now abandoned, and inflammation (we believe) has ceased; and yet life is cut short while we are helping the faint efforts of

the constitution, and still waiting and hoping for reparation to reach the point of present safety.

What is thus shown to be true of endocarditis and pericarditis, when each is taken alone, is, without further explanation, at once seen to be true of them when both are taken together. It is simply this, that the different amount of organic injury remaining, after the inflammation has ceased, is one sufficient reason of reparation being found quick or slow, easy or difficult, in different cases, to reach the point at which life shall be safe.

These are matters plain and obvious enough, it is true. Nevertheless they need to be strongly insisted upon, for they have an important bearing upon practice. In every case of cardiac inflammation, think of its local effects, and then strive by all means to cure it, and above all, strive to cure it *quickly*. For the longer it lingers, the greater will be the amount of organic injury which it leaves behind, and the greater the likelihood that a painful precarious period will succeed before life is safe.

But besides the absolute amount of injury done to the heart itself, whether small or great, other conditions, just as plain and palpable, often exist elsewhere, which have a share in determining how soon or how late, with what ease or what difficulty, that measure of reparation shall take

place, which is to put the life of the patient in safety again.

The coincidence of inflammation of the lungs with inflammation of the heart* has been already pointed out. That inflammation may be of any or of every pulmonary structure. It may be bronchitis pneumonia or pleurisy; one of them alone, or two of them, or all of them united. And these, when they so occur, are apt (it will be remembered) to run on to those terminations which we most deprecate, to large bronchial effusion, to large pulmonary congestion or hepatization, and to single or double hydrothorax or empyema.

Now, as the life of the patient was doubly jeopardized by the coincident inflammation of the two vital organs while it was yet in progress; so, when it has come to an end, the remaining organic injury of both makes the work of reparation longer and more difficult, and postpones the safety of the patient to a more distant day.

But, as the peril of inflammation, while it is yet progressive, is not always in exact proportion to its extent within the part, so neither, when it is brought to an end, are the chances of safety and reparation to be measured absolutely by the amount of the material injury done.

The whole body has to do with the health of

* Vide Lecture IX.

its single parts, and it has to do with their diseases also, in originating and maintaining, in arresting and repairing them. Look to the mere matter and bulk of things, and think only of what is visible tangible and audible in parts, and you will come to strange conclusions: you will see people die of too little to kill them, and see people survive what is enough to kill them twenty times over. But if, in such events, you would know what it is that *mainly* kills, and what that *mainly* saves, you must look out of the part into the constitution at large: you must do so especially in diseases of the heart.

It goes hard with weak, scrofulous children, and with men and women whose habitual health is no better than an habitual infirmity, when they come to suffer inflammation of any vital organ: but it often goes still harder with them after the inflammation has ceased, if much be left for reparation. Subjects of this unhappy constitution will struggle through a combined attack of inflammation of the heart and lungs, and hold out well until it has come to an end, and will afterwards die during the halting, ineffectual efforts of reparation, or only after a very long time, and many vicissitudes, will reach the point of safety at last. Their constitution has given all it could to the disease without dying, and it has now not enough, or scarcely enough, left to give for re-

paration, or, rather, for that degree of reparation which is needed for present safety.

What that degree is, cannot be accurately told. Yet the habitual health of individual patients will furnish a kind of measure of what it is likely to be in *them*. The worse their natural constitution, the less injury can be borne, and the nearer must the injured organ have returned to the state of its former integrity before their life is safe. This, unfortunately, is as much as to say that the most reparation is needed, where, in the nature of things, the least can be expected.

As it has been chiefly in weak, scrofulous children that I have witnessed this struggle for life, or this state of insecurity, most prolonged after the inflammation has ceased, I shall take from them the type of certain conditions which I wish to describe.

Some, when the time has come that they should show the visible tokens of recovery, have exhibited a perilous prostration of the nervous system, and such alternate rallying and sinking as have kept the bystanders in apprehension of their death for weeks and weeks together. But recovery from this condition is more frequent than death, such a recovery, I mean, as reaches a state of present safety, but still with an unsound heart.

Some, when we have looked for their visible recovery, have sunk into anæmia; anæmia so extreme and so protracted, that with them it seemed

as if their food would never again be duly converted into blood. Yet these, too, may, and commonly do, at length reach a state of present safety; but still with an unsound heart.

It is most important to remark that, while this prostration of the nervous system, or this anæmia, has lasted, whether for weeks or for months, reparation has been at a pause. Neither the heart, nor the lungs, nor the pleura, if they happen to have suffered damage, have seemed to make any progress in the mean time towards regaining that degree of soundness of which they are capable.

During the pause of reparation, and in the midst of this nervous failure, or this impoverishment of blood, the feet and ankles are apt to swell, an event which is looked upon as a mere accident of debility, and is hardly taken into account in calculating the fate of the patient. But sometimes this small œdema will rise rapidly into general dropsy, and serum be found wherever it can find its way, filling cavities, and distending the cellular texture throughout the body. Thus, the largest and most pervasive of all diseases, which is commonly reserved as the last fatal result, when the heart has reached the most extreme degree of disorganization that it is capable of, is sometimes an early consequence of its acute disease, arising partly out of the very damage done by the disease itself, and partly out of the feeble constitution,

which it has befallen, being put to a severer trial than it can bear.

But I have seen recovery even from this condition, the dropsy entirely dissipated, the patient again safe, and every organ again free from complaint, except the heart, which has remained permanently unsound.

Yet it may not be either the amount of injury suffered by the heart itself or of concomitant injury suffered by the lungs, or yet the weakness or pravity of constitution which makes reparation a halting, lingering process; it may be none of these that, after inflammation has ceased, still keeps back the patient from the point of safety. Nay, the structural damage may have reached that degree of restitution which should bring security, and yet there may be something less material and less defineable, but fearfully real, which continues to hold life in jeopardy.

Disease is a great physiological teacher. Perhaps it is the greatest of all. It institutes experiments which we cannot imitate, and so tells us many things which, but for it, we should never know. I never laid bare a living brain, a living spinal marrow, or a living heart. I never took up a living nerve with the forceps, or noted the behaviour of these organs severally or reciprocally under modes of irritation which were of my own contrivance; yet, I have read of experiments which I never performed, and never could bear to

see; and I may have learnt something from them; something, how dearly purchased!

But above and beyond all knowledge so obtained, there is a knowledge conveyed by the living phenomena of diseases, and by them only. Coincident with symptoms referable to the endocardium or pericardium, in one case there has been maniacal delirium, in another epileptic or tetanic convulsion, in another chorea, in another coma, in another fatuity. The patients have died, and dissection has found the brain healthy, and the spinal marrow healthy, and the endocardium and the pericardium alone inflamed. Now, have all the experiments that were ever done or perpetrated upon living animals given intimation of an influence like this, proceeding from the heart to the brain, and from the heart to the spinal marrow? Has not disease here been our teacher?

All these affections of the brain and spinal marrow, coming on in the course of inflammation of the heart, should be carefully watched and ministered to from the least to the greatest. Wild delirium, epileptic, or tetanic convulsion, chorea, coma, fatuity, are the greatest and the rarest; and mutterings, reveries, transitions from torpor to excitement, subsultus, are the least and the most frequent. But they are all akin one to another. The least may mount up to the greatest, and the greatest run down to the least.

Moreover, where any of these have been during

the progress of the disease, and the patient has survived, they are liable to be continued or to recur during its reparation. Or they may then arise for the first time, as if they took advantage of the weakness and exhaustion of the nervous system.

A year or two ago I saw a young lady seventeen or eighteen years of age, who had suffered acute rheumatism, and with it inflammation both of the endocardium and pericardium. As active symptoms declined and active remedies were withdrawn, her extreme weakness became apparent. Her nervous system was laid prostrate. Her reason began to totter, and in a few days her mind was entirely gone. And thus, still without reason but not without consciousness, living but not rallying, and her vital functions scarcely kept going from hour to hour, she remained for several weeks. At length mind and body recovered together by little and little, and she reached the point of present safety. But neither mind nor body were so far re-established, while she continued under my observation, as to enable me to see to what condition they would permanently revert. The heart beat with some excess of impulse, and with a loud endocardial murmur; and I reckoned on permanent adhesion of the pericardium and permanent unsoundness of the mitral valve. But, moreover, I still feared and questioned what would be the eventual state of

her mind, and still looked to some possible evil being engrafted upon her extreme weakness. She was taken home by her parents to the north of England, and her mind was perfectly restored. But after the lapse of a twelvemonth she died of pulmonary consumption.

A young man, twenty-eight years of age, after having suffered rheumatic attacks, which had continued subsiding and returning during eight weeks, came at length under medical care. He was now in a state of fatuity, and so continued until, his strength daily diminishing, in three weeks more he died. "The pericardium was free from disease; but upon the mitral valve, near its edge, there was a perfect row of small slender bead-like warts."* The case is reported by Dr. Watson, and is valuable, among other reasons, especially for this, that it authenticates the pathological connection of these awful affections of the brain with endocarditis. Their connection with pericarditis is the more acknowledged and familiar fact.

The same physician relates another case, which I will abridge. A young man, twenty-four years of age, suffered an attack of acute rheumatism, which was of a shifting character, and confined him to bed for six days. Leaving his bed prematurely, he suffered a relapse, and afterwards continued slowly mending until the eleventh day,

* Med. Gazette, vol. xvi. p 93.

when he became restless and delirious. Hitherto the symptoms referable to the heart had been equivocal, consisting chiefly of pain. At this time, when Dr. Watson first saw him, he found the heart's disease sufficiently attested by its irregular action, its excessive impulse, and its loud endocardial murmur. But it was the state of the brain, which had now become the great object of interest and apprehension. A sort of stupor, or obstinate taciturnity through the day, passed into distinct delirium at night. Such was his condition for six days, when stupor was exchanged for restlessness, and restlessness for maniacal frenzy with screaming and vociferation. And then tetanic convulsion alternated with coma, and in three days he died. Upon dissection, at a small space of the posterior surface of the heart, the pericardium presented an adhesion of recent lymph, and the mitral valve and the aortic valve numerous bead-like vegetations.*

Dr. Watson alludes to another case, without describing it. A young woman, nineteen years of age, went through an attack of acute rheumatism, accompanied by inflammation of the endocardium and pericardium: "She lived two months from the commencement of her cardiac disease: during that period she was at times wildly delirious, at times stupid, taciturn, and almost idiotic, and at times quiet and rational."†

* Med. Gazette, vol. xv. p. 94.

† Ibid.

In one of these three cases given by Dr. Watson, there was no visible trace within the brain of any thing different from healthy structure. In the other two, there was some fulness of the blood-vessels of the brain and some slight serous effusion. Whether these last really partook of the nature of disease, *i. e.* of inflammation; and if so, what share they had in producing the symptoms, I will not stop to inquire.

My purpose is, to make you aware that, when endocarditis and pericarditis have ceased to threaten life in their own way and by their own direct instrumentality and their reparation has already begun, they may yet induce perils of a new kind, and death after a new manner, through the troubled functions of the brain and spinal marrow.

LECTURE XIX.

PERMANENT UNSOUNDNESS OF THE HEART FROM THE INJURY DONE BY ENDOCARDITIS AND PERICARDITIS BEING IMPERFECTLY REPAIRED.—CONSEQUENCES.—SECONDARY INFLAMMATIONS.—THEIR CLINICAL HISTORY.—THEIR CLINICAL DIAGNOSIS.—ITS EXTREME DIFFICULTY AND UNCERTAINTY.—SEVERE AND FATAL CASES.—COMMENTARY UPON THEM AT LARGE.

WE have been considering that important period of the clinical history of endocardial and pericardial inflammation which intervenes between the cessation of the disease and the restitution of the organ, not to a state of complete soundness, but to a state compatible with present safety.

But of all organs in the body, the heart can least endure any imperfection of its natural structure; and yet in the vast majority of cases where the endocardium or the pericardium has been inflamed, some imperfection of structure is left behind: hence the great interest which belongs to them prospectively.

Now seventy such cases occurred to me at St. Bartholomew's Hospital in the course of five years. Seventy patients, who had suffered endocarditis or pericarditis or both, were restored to a state of present safety, but not of perfect sound-

ness, and then discharged. It will be by the merest chance that any one of them will ever be seen by me again; yet, could they all have been kept within the reach of medical observation for the rest of their lives, they would without doubt afford some valuable results. But the conditions of medical practice do not allow such lengthened observation of any seventy individual patients. Our own lives must needs last for many generations to furnish us an experience of other men's diseases in their entire course, which last the half or the whole of theirs.

But do not let us make the difficulties of clinical observation under any circumstances greater than they are. Its end, indeed, can never be answered by less intercourse with the sick than is needed to mark each material change that occurs in the progress of the disease: more than this it does not require. Thus when the disease is of an acute kind, and runs its course in five or ten or twenty days, the physician's intercourse with the patient must be daily, and perhaps more than once a day. For every day, and, perhaps, more than once a day, changes are apt to take place, which must be noted as they arise, if they are to be successfully ministered to. But when the disease is chronic, and lasts five or ten or twenty years, this intercourse need not be oftener than at intervals of months, or even once or twice a year; for it is only at such intervals that those

changes are apparent which are likely to call for his interference. And these surely are easy terms of making the clinical observation of chronic disease adequate to its purpose. But it is the opportunity of making it even upon these terms, which is so difficult to be obtained. How rarely has it happened to any of us to have numerous individuals the subjects of any given chronic disease, so constantly within our reach, that we could see them and inquire into their condition two or three times a year, for many years together, or for the whole of their lives!* Thus all I know, and all I can tell, of what is apt to result from the heart left in an unsound state by an attack of by-gone inflammation, is drawn, not from following up any certain number of cases from first to last, but from such accidental experience as in the course of years has fallen to my share, and been furnished by, here and there, a case which I have happened to meet with.

There are some truths in medicine which are based upon numbers and upon statistical calculations, and which thus carry with them the highest proof of their certainty. And there are others which are and only can be picked up piecemeal and by accident; yet these may be equally truths

* Vide Vol. I. p. 156, for an explanation of the different ways by which we gain our knowledge of acute and chronic diseases.

in themselves, though they are not equally known to be so: they may be called chance-truths, lying out of the high road of philosophy; but Philosophy is not wise, if she does not step aside to gather them.

You would wish to know the fate of those who are left with hearts damaged by the effects of inflammation; and could I give you a summary of events drawn from a complete history of three-score and ten cases, I should be giving you both the truth, and withal the highest proof of its certainty. But I can only give you single and scattered notices of events drawn from a partial observation of such cases as have happened to fall in my way. And thus I may still be giving you the very truth, but without the highest proof of its certainty.

Such cases, then, as have fallen in my way have taught me, that after endocarditis or pericarditis have left the heart in a state of unsoundness, but life safe for the present, the period to which life may be still continued is very various. It may be a few months only, or a few years; or it may be many years, even ten, or twenty, or thirty.

Of these facts I am certain; but I cannot array them numerically and statistically: and because I cannot, I can determine no relative proportion between those who survive months and those who survive years; or those who survive few years, and those who survive many: yet the facts are sure. And, although they come from casual observa-

tion, they admit of being grouped and generalised, and dealt with instructively, and fair reasons may be given for their being such as they are.

Such cases have two principal terminations. Either there may be a renewal of the same disease in the unrepaired structure, or in some other structure of the heart, or, the unrepaired structures remaining as they were left, may become the element of further detriment to the organ, which is different in kind. Each of these results shall be taken and considered separately, and in the mean time it will, perhaps, appear why the course of events, and the duration of life, are so various in those who owe their unsoundness of heart to a common cause.

Each of these results shall (I say) be considered separately; for, although they are found mixed together, the things themselves are separate in kind. The one, the secondary inflammation, partakes of the nature of an accident; the other, the progressive disorganisation, springs from an inevitable tendency. The thing of accident may or may not be added to the thing of inevitable tendency at any period of its growth. Fresh inflammation may or may not arise in the heart already unsound, and tending to further disorganisation.

Let us first consider the clinical history and clinical diagnosis of the incidental secondary inflammation.

Whoever has had his heart once inflamed (whether it be the endocardium or pericardium which is the seat of disease) and left thenceforth permanently unsound, may have it inflamed again, and he may die of the second inflammation as he might have died of the first, or he may escape with his life as he escaped before. And not once only, but again and again, his heart may be inflamed afresh, and in some of these attacks he may die, or he may struggle through them all and reach a state of present safety for the twentieth time.

This renewed inflammation may be either of the endocardium or of the pericardium, or of both. It may arise, as it did at first, out of an attack of acute rheumatism; or, though it came at first from acute rheumatism, it may come independently of it afterwards.

Remember, acute rheumatism is (if we may so speak pathologically) the great parent root of inflammations of the heart. It is also, undoubtedly, one of those diseases for which men are found to have a constitutional proneness. When it has been once suffered early in life, there is a fearful likelihood that it will be oftentimes suffered again. Moreover, the first attack is generally the type of every attack which is to follow. They may not all be equally severe, but they will all take the same course, and involve the same structures. If the first involve the heart, so, probably, will they all.

Thus, the thought of a healthy child first seized with acute rheumatism is full of sorrowful forebodings. Its heart is very likely to be inflamed, and it may die: but, whether it die or not, its heart is very likely to be damaged for life. Having had acute rheumatism once, though it may perfectly recover, it is very likely to have it again; and, whenever it again has acute rheumatism, it is very likely again to have inflammation of the heart as its accompaniment.

But, certain causes, which are not apt to produce inflammation of the heart *de novo*, are found capable of renewing it in its half-repaired condition. A single exposure to cold, a single act of intemperate indulgence, or some unusual bodily effort, in a man of unsound heart (unsound from the effects of former inflammation), will sometimes bring life into jeopardy, and sometimes kill; and, dying, he will disclose in the endocardium, or the pericardium, indubitable traces of a new inflammation, mixed with the effects of the old.

Still, if what I have seen may be taken to represent what generally happens (for I have no statistics to appeal to in this matter), when the unsound heart is re-inflamed, it is almost always in consequence of a fresh rheumatic attack; but it is not exempt from the possibility of being re-inflamed by other causes.

There are some other circumstances belonging to the clinical history of this secondary inflamma-

tion of the heart which deserve to be mentioned. Like its primary inflammation, it also is apt to be associated with pulmonary inflammation, with genuine pneumonia, with bronchitis, with pleurisy. Then, as to the secondary carditis itself, it may be either of the endocardium or of the pericardium, or of both. Of these structures, when both have been formerly inflamed, and both left in a state of imperfect reparation, one alone, or both simultaneously, may be inflamed again; or, when one only has been formerly inflamed, and left in a state of imperfect reparation, it may be that the other, which was then unaffected, is that which is now inflamed. In this case the inflammation, while it is secondary as belonging to the heart, is still primary in respect of the particular structure which it attacks.

Such, as far as I know, are the conditions under which fresh inflammation is apt to arise in a heart which previous inflammation has left unsound. Such is its clinical history; we now come to its clinical diagnosis.

Inflammation of a heart previously unsound does not submit itself to so easy and sure a diagnosis as inflammation of a heart previously healthy.

Diagnosis is greatly helped by contrast. Where yesterday there was perfect health and to-day there is disease, a transition has taken place from opposite to opposite. All we see, and all the patient feels, is full of novelty and surprise; and,

that disease is involved in the change, we know at once, and we soon find out its nature and its seat by a closer scrutiny. But, where yesterday there was not perfect health and to-day there is disease, doubtless here, too, a change has taken place, yet not so marked a change that either the patient from what he feels, or the physician from what he sees, can be sure that morbid actions of a new and fatal tendency have arisen which were not there before. Thus inflammation will often make secret progress under cover of an habitual infirmity.

Organs that are unsound of structure are often in pain, and often baffled in function, and, where new disease befalls them, how otherwise can they betray it but still by pain and still by irregular function? The heart that has a valve thickened and an orifice contracted, or its pericardium adherent, is apt to suffer pain, and to palpitate and beat out of time. And, when in this condition inflammation assails it, it cannot do more than still suffer pain, and still palpitate, and still beat out of time.

Well! but the heart will *then* do all this in excess; and the excess, you may think, will surely be a sufficient token of the new disease which has supervened. Not so surely as you may imagine. There are no certain measures of pain, of palpitation, and irregular action, annexed to a given amount of unsoundness in the heart. These are

ever varying between the least and the greatest degrees, while the heart's unsoundness remains exactly the same. The natural sensibilities of the organ render it obnoxious to a multitude of impressions, some from without and some from within the body, some appreciable and some not, which are perpetually disturbing its feelings and its functions in its state of health. And how much more is this likely to be the case in its state of unsoundness ! And if so, then surely of inflammation ingrafted upon this unsoundness, the mere excess, to which we allude, must be a most precarious token.

In short, it is a general truth, never formally declared perhaps, but well worth our notice and of great practical importance, that organs must be previously sound to show clearly the nature of the injury or malady which they suffer, and that, in proportion as they are unsound, they are spoiled for giving true expression to the ills which afterwards befall them. The brain, the lungs, the kidneys, the abdominal viscera, being previously sound and healthy, proclaim themselves inflamed at once. But the brain, with a clot of blood lodged within it, tuberculated lungs, granulated kidneys, a scirrhus stomach, an ulcerated bowel, have their functions and sensibilities in utter disorder and confusion, and are not in a condition to give requisite notice of a new inflammation. A broken instrument is ever out of tune : whatever

key you touch, you can never bring out the right note corresponding with it.

But in the heart, you may say, there are always the auscultatory signs to look to. In default of all others, these have been often found enough to settle our diagnosis. Can they do as much now? Are they now self-sufficient? Are they even auxiliary? No; they are neither; they even fail us altogether. In the first inflammation of the sound heart, they were every thing. In all after inflammations of the unsound heart, they are nothing. This is the fact, and it is readily explained.

In the first inflammation of the pericardium, there is the exocardial murmur made by the moving of its roughened surfaces upon each other. But in after inflammation of the pericardium, exocardial murmur there is none, and none can there be if its surfaces adhere completely. And if they adhere partially and there be a murmur, it will not have the proper attrition in it, and so will want the exocardial character. In the first inflammation of the endocardium, there is the endocardial murmur, made by the recent lymph deposited upon a valve; and the murmur continues ever afterwards, when the valve so far falls short of perfect reparation as to remain thickened or puckered. And then in after inflammations, observe the puzzle. There is the permanent murmur of the old unsoundness and the recent

murmur of the new disease ; but how much is due to the old, and how much more to the new, is too delicate an affair for the nicest ear to discriminate.

But all that has been said still waits for its confirmation by cases. And the cases which I am about to relate are chiefly fatal ones. For so much doubt and perplexity confessedly hang over the clinical diagnosis of these secondary inflammations of the heart, that no fair illustration can be given of them without the proofs afforded by dissection after death. Let it not, however, be therefore inferred that the fatal cases are the most frequent. My impression, on the contrary, is that the secondary inflammation, whether of the endocardium or the pericardium, is rarely fatal. It may add sometimes a little and sometimes much, and always something to the permanent unsoundness of the particular structures, yet it seldom produces present death, but leaves it to arrive at last from the gradually and slowly increasing disorganisation of the entire heart.

In presenting the few cases necessary to illustrate our present subject, I must be allowed to comment upon them as I go along. For it is of no use relating cases at all, unless you may take them in pieces and examine them as men do models in a workshop.

In the following case an attack of acute rheumatism, two years before, had been accompanied by inflammation of the pericardium, which had

left the heart permanently unsound. A fresh attack of acute rheumatism was accompanied by inflammation of the endocardium, which proved fatal.

Amelia West, aged 22, was carried into the hospital, September 24th, 1836. Her countenance was pale, her skin hot and perspiring, her tongue furred and bordered with red at the edges, and streaked with red down the centre. Her pulse was 120, and very full and hard withal. Many of her larger joints were greatly swelled and very painful, and upon the skin, covering some of them, was a blush of red. Her respiration was short and difficult, and her heart beat with an excessive impulse. Her whole chest (she complained) was bound so tight that it could not expand, yet auscultation found nothing amiss in the lungs; and in the heart it only found what was already evident to the touch, an excessive impulse. It detected no unnatural sound.

Such were her present symptoms. Her previous history, bearing upon her present condition, was this,—she had suffered two severe attacks of acute rheumatism before, and this was the third. The last, two years ago, was accompanied by an affection of the *chest*, for which she was bled. Her present attack began with wandering pains, which followed an exposure to cold, a month ago. These, together with sickness and head-ache, continued, and showed neither increase nor abatement until

five days ago, when fever was lighted up, and the joints began to swell, and the heart to palpitate, and the respiration to fail, and all had been becoming worse and worse from that time forth until now.

Here was perilous disease in progress: but where was it, and what was it? Our auscultation excluded the lungs: it must then be in the heart. The inordinate impulse and all the attendant anguish, arising and increasing as the acute rheumatic symptoms arose and increased, seemed to determine that here must be its seat. But was it inflammation, and in what *part* of the heart was its seat? The mere excess of impulse and the severe anguish, did not settle the questions. Symptoms may be very striking and prominent in themselves, and yet be very indefinite in what they denote. And such were these. But further assuming (as it was practically right to assume, and we did assume) that the disease was inflammation, either of the endocardium or the pericardium, was it ingrafted upon an unsound heart, or had it come *de novo* in a sound one? And this we could only determine by learning in what state her last rheumatism had left her, and her present rheumatism had found her. But the poor patient was too simple and too ill to give any intelligible account of the matter; and we knew nothing of her until we found her in her present perilous condition. Nevertheless, from the fact that in a former attack of rheumatism,

the chest was so affected as to need bleeding for its relief, we ventured to consider the present inflammation (if inflammation it was) ingrafted upon an unsound heart.

But to proceed with the case. Here were symptoms not to be trifled with. The fever ran very high. The proper rheumatic symptoms and all that concerned the joints were very severe, and very severe too was all that concerned the chest, and, if it were inflammation, very perilous and very rapidly progressive. The dyspnœa and præcordial anguish called for immediate relief by some remedy capable of a present impression. Accordingly for this a full cupping was practised. Also the renewed inflammation was to be abated, and ultimately abolished. Accordingly mercury was directed, with the view of bringing the constitution as soon as possible under its influence, and ten grains of calomel immediately, and ten grains of calomel on the following morning, were given, united with opium.

The dyspnœa and tightness of the chest were at once greatly diminished, and the respiration suffered no urgent distress for the five following days. But no restraint was yet put upon the violent impulse of the heart. Diarrhœa arose on the third day, and interfered with the further use of calomel, and so Dover's powder was employed to meet the urgency of this particular symptom, as well as to quiet the nervous system.

On the fourth day the gums were decidedly sore, and swollen, and the tongue was loaded with a yellow fur. The proper rheumatic symptoms were nearly gone, and the symptoms belonging to the chest, were restricted to the heart, which beat with more violence than ever, but still without any unnatural sound.

On the fifth morning, after a night of much sleep, she was said to wake much more comfortable, and so to continue until noonday, when suddenly the breathing became very short and painful, and the nostrils were dilated at each inspiration, and the countenance betokened great distress. The heart continued to beat with the same violence, but with less frequency, and now for the first time with a slight systolic endocardial murmur. The gums were very sore. A mustard cataplasm was applied to the chest, and the Dover's powder was continued. The cataplasm gave great relief.

On the sixth morning, it was found that the relief of the chest procured by the cataplasm, had continued through the night, until nine in the morning; and then she became faint, and all the distress of yesterday returned, and with it a cold perspiration, and a sad struggle to dislodge some scanty phlegm which vexed the trachea. The heart beat both with less force, and less frequency, and no endocardial murmur was perceptible. The

mustard cataplasm was re-applied, but no relief followed.

On the seventh morning, after a night of agonising distress, she was bathed with cold perspiration; the trunk of the body was bent upon the knees, and thus she was contending for breath, and striving to clear the throat by an effort of coughing, but in vain. The heart was beating feebly and tumultuously, but without unnatural sound. Yet in this condition, she struggled through another night, and at nine o'clock the next morning, after lying an hour upon her back, she expired.

It was matter of interesting speculation what would be found on examination after death. As far as auscultation could be trusted for negative results, it showed that the lungs had no share in the disease. Symptoms referable to the heart, viz. pain and inordinate impulse, which arose with the new rheumatic attack, and afterwards continued, pointed to this as the organ affected. But these symptoms were not enough to denote either the nature or the seat of the disease. A systolic endocardial murmur which came one day, and was gone the next, — viz. the day before the patient began suddenly to sink, — was the only symptom to suggest that the seat of the new disease was the endocardium.

Both lungs had contracted extensive and very intimate adhesions to the ribs anteriorly. The left

pleural cavity, where it was free, contained about three ounces of serum. The lungs and bronchial tubes were healthy. The pericardium was universally and closely adherent to the heart. The intervening matter was thick, and at some parts as condensed, and as hard as cartilage. Both auricles were greatly dilated and choked with coagula. The right ventricle was simply dilated in a moderate degree; the left ventricle both greatly dilated and greatly hypertrophied; and in its large *carneæ columnæ* were some peculiar deposits giving them the appearance of grained oak. The lining membrane of both auricles was opaque and thickened. Both the tricuspid and the mitral valves on their auricular aspects, and near to their edges, had numerous beads of lymph growing from the surface, but leaving it entire, when they were picked off by the forceps. In the mitral valve they formed almost an entire circle: on the tricuspid they were fewer. Among them there were some that had become much larger than the rest, even as large as a pea, and were loosely pendulous into the ventricle. The auriculo-ventricular orifice had not on either side of the heart undergone any obvious contraction. Both the pulmonary and aortic valves were free from disease.

The liver was enlarged, and congested with bile and blood. (W. xx. 121.)

The next case, as it ran on speedily to its fatal

termination, gave a short, and striking, and rapid proof, how the previous unsoundness of the organ can mar the diagnosis of its subsequent diseases.

An attack of acute rheumatism, a year and half before, had been accompanied by inflammation of the pericardium, which had left the heart permanently unsound; and a fresh attack of rheumatism produced fresh inflammation of the pericardium, which killed. The symptoms plainly belonged to the heart, and plainly showed that it was most perilously affected. But they were not definite enough, either to characterise the nature of its disease, or to denote the texture of the organ which it occupied.

William Bean, aged 12, was admitted into the hospital, December 16th, 1833, and died on the evening of the 19th. His symptoms on admission were these:—skin hot and dry, tongue moist and white, pulse 140 and jerking, swelling and slight redness and pain of the right wrist and hand, but of no other part of the body: breathing hurried and short, with a slight cough: pain in the præcordial region, increased by pressure between the ribs, and by deep inspiration; excessive impulse of the heart; inability to lie on the left side. Auscultation found the lungs admitting air freely in every part, and at a circumscribed spot beneath the cartilages of the third and fourth ribs on the left side, the systole of the heart was heard, accompanied by an unnatural

sound of an indefinite kind. The sound was lost when the stethoscope was removed from this spot in the least degree.

The history of the present attack could not be made out with all the exactness which was desirable. The boy's father, and mother, and himself, were all in a different story as to when he was taken ill, and whether his chest or his limbs were affected first. The poor often take small account of what they or their children suffer short of their being absolutely incapacitated; and this very circumstance is apt to operate as a bar to the information we seek in many an interesting case. But we who know the poor are not surprised at it. They do and must endure daily a measure of (what we should think) physical evil; but habit naturally blunts their perception of it to themselves, and their sympathy for it in others. And well it is that it is so.

Thus much, however, as to our present case, was pretty certain, that the rheumatism had existed a week at least, and the symptoms referable to the heart several days; that the rheumatism had occupied the knees and ancles of both lower extremities as well as the hand, and now might be considered on the decline; and that the symptoms referable to the heart (which were in truth habitual symptoms of long standing now greatly aggravated), had been becoming daily worse and worse. It appeared, too, that the attack com-

menced with a *rigor*, followed by heat and perspiration.

The history of the patient's previous state, so far as it bore upon his present condition, was simply this. The boy had suffered acute rheumatism a year and a half ago, and from that time he had been never free from palpitation and uneasiness in the region of the heart, which he had not experienced before.

The progress of his symptoms during the brief period which intervened between his admission and his death, and their treatment, it will be enough to state succinctly.

Six leeches were applied to the region of the heart, and three grains of calomel, and a quarter of a grain of opium, ordered to be given every six hours.

He was visited at 8 o'clock P. M. on the same day, and found dozing. He had been delirious in the course of the afternoon, but had derived some relief from the leeches, and was now quite collected.

The next day, the bowels suffering irritation, the dose of calomel was reduced from three grains to one, and a drachm of strong mercurial ointment ordered to be rubbed in night and morning: after forty-eight hours from the time of his admission a great change had taken place; the pain and swelling of the hand had ceased entirely; the fever was almost gone. There had been two nights of

sleep and two days of quietude: even the pain referable to the præcordial region was uncomplained of, until it was provoked by pressure, by deep inspiration, or by lying on the right side. Then the pain was there still.

It may be remarked, that the murmur which on our first examination was heard at the cartilages of the third and fourth ribs, was never afterwards heard either there or any where else.

Thus it could not be denied that the active symptoms of the disease were abated, and the disease itself was probably brought to a pause: but there was no sign of rallying withal. The air passed uninterruptedly through both lungs, still the respirations were 64 in a minute. The heart was almost without pain: still it beat tumultuously, and 150 strokes in a minute. It is a bad omen when disease declines, and yet is followed by no token of returning health; there is then a fearful expectation of what may come next. Every function of heart, and brain, and blood-vessel, and nerve, was ebbing and running down, but death not yet in sight, though surely nigh at hand.

On the morrow, the 19th, the third day from his admission, at 11 A. M., he was found with features collapsed, and lips blue, and forehead covered with perspiration, and coughing up a scanty mucus, tinged with blood. Respiration 60, and unequal; pulse 164, and small as a thread;

yet the heart and the carotids bounding vehemently; the præcordial region quite free from pain. We tried to make an auscultation of the heart, and especially of the lungs, but he could not bear it, and we desisted. At 2 P. M. countenance was more dusky, and lips more blue, and respiration more distressed. At 6 P. M. hands and feet cold, respirations 72, pulse countless; yet the impulse of the heart was still great: he was still rational, and free from pain. At 8 P. M. he shrieked out from sudden severe pain, as from spasm, and in five minutes he died.

On examination after death, the cavity of each pleura was found to contain four ounces of serum, while the membrane itself appeared healthy. Both lungs were gorged with blood, and their lower lobes were becoming hepatised, and loose of texture, and yielding to the pressure of the fingers. The heart occupied an unusually large space in front of the chest. There was no trace of disease on the pericardium exteriorly; but being laid open, it disclosed the distinct results of two inflammations occurring at distant periods; viz. certain spaces of such close and intimate adhesion, that its separation was impossible without either tearing the heart or tearing the membrane, and certain spaces intervening between these of a loose adhesion, by means of soft flocculent lymph, largely accumulated upon its opposite surfaces, and reaching from one to the other;

this lymph was mixed with serum and blood, from which it had taken a stain of red. The muscular substance of the heart bore not any mark of disease, neither did the internal lining, or the valves.—(M. 19. 130.)

Cases need not be further multiplied (the two which have been related are quite enough) to show the uncertain diagnosis and possible fatality of inflammation, renewed by a fresh attack of rheumatism in the endocardium or the pericardium of a heart which has been left unsound after a former attack.

But the inflammation does not require an attack of rheumatism to renew it; it will be enough just to give the outline of a case in proof of this ; a case where endocarditis and pericarditis arose, during the progress of acute pleuro-pneumonia, in a heart which had its pericardium already adherent. Here the mixture of equivocal circumstances, and the complexity of the disease threw a veil over one half of it at least, and the patient was believed to have suffered, and to have died of pleuro-pneumonia, and pleuro-pneumonia only, until dissection disclosed the traces of recent inflammation both without and within the heart.

Elizabeth Broom, aged 18, was admitted into the hospital May 30. 1836. Fever and frequent pulse, and dyspnœa, and cough, and glutinous rust-coloured sputa, at once gave intimation of pneumonia, and auscultation presently con-

firmed the same; for a bronchial respiration and a bronchial voice proceeded from the greater part of both lungs behind, with here and there some small crepitation, while all below each scapula was dull to percussion: moreover, auscultation found, coincident with the systole of the heart, and pervading the præcordial region, and conveyed along the aorta and carotids a distinct endocardial murmur.

A fortnight ago, after exposure to cold, she had been seized with a severe rigor, followed by heat and dyspnœa, and pain in the side; whereupon she had applied to a dispensary, and was largely bled, and leeches, and blistered: thus some immediate relief was obtained. But the disease, which was only checked, afterwards proceeded; and now, after the lapse of a fortnight, it was beyond the reach of a remedy. The poor girl was evidently sinking, and had only come into the hospital to die,—to die of the double pneumonia, as was thought, and nothing else; and surely it was quite enough to kill her.

But what meant the endocardial murmur found every where in the præcordial region, and conveyed through the arteries? It was too prominent a symptom to escape our notice, and it became our aim to make out what it really meant. Now these facts were pretty clearly ascertained,—that two years ago the patient had had acute rheumatism, and that ever afterwards

she had suffered palpitation and frequent uneasiness in the seat of the heart. Here the rheumatism two years ago, the abiding palpitation from that time forth, and the present endocardial murmur, were facts which fitted into one another as compactly as one could wish, and seemed to furnish a complete proof of permanent valvular injury left behind by by-gone inflammation of the endocardium.

It is true that the heart was *now* beating with some excess of impulse; but so it had been (we learnt) for the last two years. It is also true that pain was referred to the left side, somewhere about the region of the heart, and that to breathe deeply increased it, and to lie on the left side increased it, and also brought on a sense of suffocation: but then the certain pneumonia and the almost certain pleurisy, were enough to account for all this.

Accordingly, we bent all our care to relieve the distress of one dying of pleuro-pneumony, thinking the heart not otherwise affected than by its old valvular injury. In four days the patient was dead. On examination, we found just what we expected in the lungs and pleura, but found nothing that we did, and every thing that we did not, expect in the heart.

On the left side the pleura exhibited every where the effects of acute inflammation. One-half of it was adherent, having, by lymph from

its opposite surfaces, brought the entire lower lobe of the lung and the external pericardium in close union with the walls of the chest. The other half had fluid effused between its folds, which compassed and compressed the upper lobe. Of the lung itself on this side, one half, the lower, was infiltrated with pus, and contained a small circumscribed abscess; the other half, the upper, seemed by being compressed to have escaped being inflamed. On the right there were no marks of pleurisy, no adhesion, no lymph, no fluid. The lower lobes of the lung presented a state of earlier inflammation, and the upper lobe a state of emphysema.

But what of the heart? In attempting to lay open the pericardium, we found the heart surrounded with bags of pus, which we could not help cutting into one after another. They were partitioned by close and firm intervening adhesions. The pus and fluid contents of these several bags could not have amounted altogether to less than half a pint. Within the heart, the tricuspid, the mitral, and the aortic valves presented deposits of lymph on their free edges, which admitted of being rubbed off, leaving a rough surface in their place. The orifices of the heart were not at all contracted, and the cavities were of their due capacity, except that the right auricle seemed somewhat dilated. The liver was congested with blood and bile. W. 21. 21.

Here, then, were displayed within the heart the traces of two inflammations which occurred at an interval of years. The firm close partial adhesions of the pericardium constituted the abiding unsoundness produced and left by the rheumatic inflammation two years before, and the deposits of pus which intervened between them, and the deposits of lymph upon the several valves, were produced and left by acute inflammation of the pericardium and endocardium, coincident with the recent attack of pleuro-pneumony.

LECTURE XX.

SECONDARY INFLAMMATIONS CONTINUED. — CERTAINTY OF OUR KNOWLEDGE OF SEVERER AND FATAL CASES. — REASONABLE CONJECTURE OF MANY LESS SEVERE AND MORE MANAGEABLE. — INFERENCE FROM SUCCESSFUL TREATMENT. — DOES INFLAMMATION, AS OFTEN AS IT IS RENEWED, ADD SOMETHING TO THE PERMANENT INJURY OF THE HEART? — REASONS FROM ANALOGY WHY IT SOMETIMES DOES NOT. — REASONS FROM OBSERVATION WHY IT OFTEN DOES. — CASE OF INFLAMMATION MANY TIMES RENEWED IN THE COURSE OF YEARS AND ULTIMATELY FATAL. — COMMENTARY UPON IT AT LARGE.

THE cases which have been related may be looked upon as giving the stamp or type of secondary inflammation of the heart. By secondary, you will recollect, is here meant inflammation occurring afresh in the endocardium, or in the pericardium, or in both, of a heart left unsound after prior inflammation, which had affected one or other or both of the same structures.

Take, then, this stamp or type of the disease and examine it carefully, and you will find that in part it leaves a clear and legible impression, and in part a faint outline only. The secondary inflammation of the heart has its clinical history

well made out, not so its clinical diagnosis. The conditions conducing to it and giving expectation that it will occur, are plain enough. The signs denoting its actual presence are equivocal and uncertain.

For the sake of illustrating this secondary inflammation of the heart, we have hitherto been dealing with its severest and its fatal instances only. For we were in search of its sure diagnostic signs; and its severest instances were most likely to display them, if any such there were. But, finding no *sure* diagnostic signs even in these, we wanted the proof which fatal instances would alone afford us, that the disease, so obscurely declaring itself during life, had a real existence. This doubt could only be set at rest by dissection after death.

The reality of the disease, and its fatal tendency, and its obscure diagnosis, being all admitted, it became the more necessary to acquaint ourselves with its coincidents and accompaniments, if perhaps by marking them, and being through them on the watch for it, and knowing when to expect it, we might catch a glimpse of it in its hiding place, and so treat it, and arrest it, and cure it.

These coincidents or accompaniments are an attack of acute rheumatism, or an attack of pneumonia or pleurisy, or an attack of fever from any cause whatever. And when any one of these befalls a man whose heart has been left

unsound by a prior inflammation, then inflammation is apt to be renewed in it afresh. And when, under such circumstances and in such a subject, the heart, which habitually palpitates and is habitually uneasy, suffers a great increase of palpitation and of pain, then its inflammation should be assumed as a fact.

It is among the general truths of pathology that parts left unsound by past disease have a greater readiness to catch disease afresh, from causes calculated to convey it, than parts which never were injured before. As a taper just blown out, will snatch the flame from the torch that scarcely touches it, and so rekindle itself at once. Thus independent of our special experience, the known pathological principle would teach us upon any extraordinary vascular excitement, whether inflammatory or febrile, to fear for the heart once inflamed and still unsound, and to watch any new symptoms belonging to it, and always to make much of them, and even to interpret them to mean inflammation, though, under ordinary circumstances, they might safely be not so regarded.

After all, then, you will observe, that, for the actual presence of this secondary inflammation in any case, and for our guidance in treating it, we have only the warrant of conjecture. It is most true.

But there is such a thing as sober conjecture,

as well as sober certainty. And diseases are treated, and cures are achieved, and lives are saved, as often under the guidance of one as the other. Such conjecture, however, is altogether different from the arrogant guess-work, which has no basis of action, and which succeeds once and fails twenty times, and knows as little why it succeeds as why it fails.

The conjecture which should guide the physician, is rigorous, and calculating, and honest. It acts strictly by rule and leaves nothing to chance. It does not absolutely see the thing it is in quest of, for then it would no longer be conjecture. But, because it does not see it, it ponders all its accidents and appurtenances, and, noting well whither they point, it takes aim in the same direction, and so oftener hits the mark than misses it. And succeeding thus, it knows why it succeeds, and it can succeed again and again upon the same terms.

Next to knowing the truth itself, is to know the direction in which it lies. And this is the peculiar praise of a sound conjecture.

Now, remember, the cases of secondary inflammation of the heart hitherto considered have been all fatal cases, all severe, all great cases, as you might call them. But there is often a relationship in medicine between the great things and the small. And we have learnt a good practical lesson when we have found out what

the relationship is. It is often such as to require that the greater should be understood first, and preparatorily. For the nature of both being the same cannot be well apprehended in its miniature forms, unless it be first studied in its larger and more striking developments. Nay, more, the smaller things being understood, require still to be handled and dealt with in continual reference to the knowledge we have of the greater.

No physician trifles with inflammations of the larynx or trachea. Some of them are of small account, just tickling the glottis, and untuning the voice; and some of them bring great oppression, from the infinite quantity of mucus perpetually expectorated and perpetually renewed, yet for the most part they are manageable enough: and some of them harass and torment with a scanty tenacious phlegm, which stings intolerably the parts it rests upon, and so there is no end of coughing night and day, yet they, too, for the most part yield to the power of medicine at last, and are cured.

But there *is* an inflammation of the larynx and trachea, which, what with the obstruction and the spasm together that are induced by it, shuts out air from the lungs, and strangles a man to death.

Now this last inflammation must be known in all its bearings, or our knowledge of all the rest will be imperfect; for, being of the same, or at least of a kindred nature, with it, they all contain

within them the possibility of growing up to the same magnitude, and placing life in the same jeopardy. Therefore, in dealing with the least of them, with the mere tickling vexing cough, we are to take it for what it is, and treat it for what it is, but not to forget what it may be. And so of all the rest.

Now, if living phenomena alone, carefully noted and compared, can be trusted without the aid of morbid anatomy for fixing by a fair conjecture the reality of a disease, then secondary inflammation of the heart has many less severe, many less intractable forms. Cases are by no means of unfrequent occurrence, running parallel with those which have been related, both in what constitutes their clinical history and their clinical diagnosis, while they are more amenable to medical treatment. Their preceding and accompanying conditions are still the same, and equally clear and definite, namely, a rheumatism, a pulmonary inflammation, or a fever; and their signs immediately referable to the heart are still the same, and equally equivocal and ambiguous, namely, augmented impulse and augmented pain.

These are the common conditions which seem to declare the individual cases tied together into one species. But what is it that declares their differences of degree, the more or the less severe case, the great or the small, the case which is far beyond, or is fairly within, the reach of medicine?

Nothing, as far as I know, but the actual trial of medicine itself will manifest all this. I believe, that whenever the heart is re-inflamed by a fresh attack of rheumatism, there is almost always a tremendous accession of palpitation and pain. Oftentimes, however, when the palpitation and the pain have been the greatest, they have been most easily subdued. So these are no sure measure of the severity of the disease, and no sure warning of its fatal result.

I could relate numerous cases of one and the same species (as I believe) with those which have been already given, yet in perfect contrast with them as to this single respect, namely, their readiness to admit the remedial impression of medicine. Contrasted with the few cases (for they *are* the few) where, on a fresh attack of rheumatism, vehement palpitation and præcordial anguish arise, and remedies have no effect in abating them, and complications of pleurisy or of pneumonia follow, and the whole man is rapidly subdued, and the end is death: contrasted with these are the many (for happily they *are* the many), where, under the like conditions, palpitation and præcordial anguish just as great arise, but they are readily controlled and abated by remedies, and no complications of pleurisy or pneumonia follow; and the constitution does not profoundly suffer, and the end is recovery. By recovery I here mean, that the attack ceases, and leaves the patient in no worse

a condition, as far as symptoms referable to the heart are concerned, than that in which it found him.

To escape with life from a renewed attack of endocarditis or pericarditis, and not only to escape with life, but without aggravation of the symptoms which permanently belong to the heart, are possible and frequent events; but they can only be ensured by discreet medical management. In such cases it is important neither to do too little nor too much. It is true there is a tremendous augmentation of distress immediately upon the accession of this secondary inflammation, but the inflammation is easily made to lose its hold (if I may so say), and the distress is soon abated.

As to the kind of medical treatment, I would remark generally, first, with respect to bleeding, that if you now direct this mode of depletion with the view of *entirely* stilling the violent action of the heart and arteries, you propose a false and impossible indication of practice; false, because this violent action is in part permanent, and has not to do with the present conditions of disease; impossible, because no quantity of bleeding short of that which would kill the patient would be adequate to the purpose; and, secondly, with respect to mercury, that all which can now be done is commonly within the reach of other remedies, and therefore that *commonly* it is unnecessary.

Leeches applied to the region of the heart will, by the immediate effect which they produce, test the sort of inflammation you have to deal with, and show whether any and what other remedy will be needed in counteraction of it. If they at once afford marked relief, they thus denote both that the inflammation is easily controllable, and that they, without the aid of any other remedy properly antiphlogistic, will be able to control it. And so it will turn out in the majority of cases. But if they afford no marked relief at once, or, still more, after their repeated application, then they plainly proclaim the inflammation beyond their power to cope with, and they call for the help of mercury (as at first) to withhold it from a fatal issue: but this does not often happen.

In the treatment of these secondary inflammations, it must always be borne in mind that they *are* secondary. We must restrict our practice to the purpose of removing so much of the disease as is superadded by the present attack, and abstain from pushing either bleeding or mercury to such an extent as we should if we proposed to play a successful after-game for the complete cure of the disease of the heart, which is impossible.

But these secondary attacks of inflammation which people suffer and recover from, and suffer and recover from again and again, do they always add something to the permanent unsoundness of

the heart? I cannot tell; but probably not always.

What is that which has really the nature of inflammation, yet of inflammation in its least degree? And what is the least material injury which inflammation is capable of doing? The following, perhaps, may be regarded as a specimen of both. I have often had occasion to examine the eye of an individual who suffered purulent ophthalmia many years ago. Part of the cornea is converted into a dense opaque substance, the cicatrix of its former injury, and part remains transparent. Often, from inclement weather, or from any cause operating injuriously on the general health, a painful sense of fulness is felt in the eye, and presently its small sphere of vision becomes cloudy; and, if it be now examined, these two changes are found to take place, one after the other, within it. First, the cicatrix is seen to be full of minute blood-vessels, while the rest of the cornea exhibits no extraordinary vascularity, unless, perhaps, there be a single vessel running across it, and carrying its blood straight into the cicatrix. Secondly, a little nebulous curtain is seen all along the margin of the cicatrix, as if it were falling down from it upon the transparent portion of the cornea. In a couple of days, without any special remedy, merely by care to avoid external cold and by abstinence from stimulating diet, the eye loses its painful sensa-

tions, and its small sphere of vision becomes again clear; and, being then examined, both the vascularity of the cicatrix and the nebulous curtain that hung from its border have disappeared.

Exactly the same malady will occur many times in the course of the year, and exactly the same processes of disease and reparation will display themselves many times in the eye, and leave it just as it was before. Here, surely, are both inflammation and *material* injury, the effect of inflammation. Yet how small are they; small both in degree and in extent! How easily produced, and how easily and entirely cured! But observe, the inflammation is of a new structure, entering into the composition of the unsound part, and it comes and it goes, and does its little temporary injury, and, after all, adds nothing to the permanent unsoundness.

Now, may we take this slight secondary inflammation of an unsound structure, and this slight material injury done by it, of which we *can* see the growth and progress, the decline and reparation in the eye; may we take them as types representing certain secondary inflammations and their effects within the body, which we *cannot* see, but which, nevertheless, we treat as inflammations, and readily seem to cure? In short, may we take them to represent what the unsound heart often suffers and recovers from, when, upon fresh attacks of acute rheumatism, it is affected in

the manner described, and, being treated as if it were inflamed, is relieved from its present excess of palpitation and pain?

Unquestionably, this is a very important class of affections of the heart which we have been considering, and needing, from the very default of precise diagnostic signs, that all their other circumstances should be the more carefully examined. It is most true that neither our eyes nor ears can testify what it is we treat, or what it is we cure, but we treat and we cure something. The clinical history of the patient, his previous condition and his past diseases and all the incidents and appurtenances of his present attack, and especially the nature of the remedies which procure his relief, are enough to show, even in default of precise diagnostic signs, that we treat and cure a secondary inflammation of the heart.

But secondary inflammation of the heart often shows itself in such a manner as to constitute a class of cases intermediate between those which were noticed in the former lecture and those which have been just described, more amenable to the treatment than the first, and less so than the last. Like the primary inflammation, it will often continue for some time after the rheumatism, or whatever be the coincident malady which seems to have reproduced it, has passed away, and still require a special treatment to withhold it from a fatal termination, and then,

as in the primary inflammation, so in this after it is fairly arrested, many weeks will sometimes elapse before the patient is brought back to a state of present safety; and then at last it will be quite evident that something has been added to the permanent unsoundness of the heart. The habitual palpitation and præcordial uneasiness will now be found greater than they were before, and having a greater amount of dyspnœa as their constant accompaniment; and they will all, palpitation, and pain, and dyspnœa, now show themselves capable of being aggravated upon slighter and more frequent occasions, and so will place every action and movement of the body under a more severe and painful restraint.

When secondary inflammation has been thus a few times renewed in the heart, and the patient, though his life be saved, has reverted after each attack to a worse condition than before, it is remarkable how little it takes to light it up afresh. A rheumatic fever is sure to do it; even a common febrile catarrh may do it; nay, it will sometimes appear to light itself up spontaneously; and thus with a cause or without a cause it will return, or seem to return, at short intervals of months or weeks, and the patient perhaps will at last die of an attack much less severe than many a one that has preceded it.

The inflammation (I say) will return, or *seem* to return; for now, when the palpitation and the

anguish of the heart and the dyspnœa are constantly severe, we must not be too peremptory in believing that every exasperation of them to a higher degree of severity is caused by a fresh access of inflammation. Sometimes mere rest will abate them, and sometimes rest with the help of an opiate; and all this looks very unlike inflammation, but is far from conclusive that it is *not* inflammation. Sometimes both rest and an opiate together will fail without the aid of leeches, and even of leeches more than once applied; and all this looks very like inflammation, but is far from conclusive that it *is* inflammation.

Here, perhaps, I ought to go into the details of a score or two of cases for confirmation of what I have been saying; but unfortunately they would need to be long details, and I dare not venture upon them. The circumstances of half a man's life may and have a bearing upon his present disease (they indeed often have upon the secondary inflammation of the heart) and, when you come to set them forth, you seem rather to be telling a story than relating a case.

One such story, however, I must tell, as a specimen. It will be found to contain a good deal to the purpose, and may stand in the place of many. There was a certain youth, David Aikin by name, and he was fifteen years of age; he was a poor puny lad, and first came under my care at St. Bartholomew's Hospital, when he was

suffering an attack of acute rheumatism. The proper rheumatic symptoms were trifling, but there was great pain in the præcordial region. The heart beat with an excessive impulse, which was perceptible over a much larger space than natural, and each contraction of the ventricles was accompanied by a loud endocardial murmur.

The boy's father said that he had never been well since his childhood. It was then that he was first ill of rheumatic fever, which affected his chest, and thenceforward he had always suffered palpitation, and shortness of breath. The palpitation, however, and dyspnœa, were now much worse than usual; and this was the case upon every fresh attack of rheumatism which he had suffered; and he had suffered a great number.

On this occasion the proper rheumatic symptoms were soon removed, but the præcordial pain and the excessive impulse of the heart were not abated, until, besides the application of leeches, a few ounces of blood were taken from the arm; and after all the impulse still remained far greater than natural, and the murmur as loud as ever; conditions which it was in vain to think of getting rid of altogether. And so in a few weeks he left the hospital, with the same palpitation, and the same asthma, as he called it, which he had had for years.

Some weeks after he was re-admitted into the hospital, suffering great distress of respiration;

yet there was a clear respiratory murmur, un-mixed with crepitation, throughout every part of the lungs. But the heart was beating most tumultuously, and with a loud endocardial murmur. There was now no rheumatism, and no accompanying fever. Mere quiet restored him to a state of tolerable comfort, and he again left the hospital without any change in the essential conditions of his complaint.

Some months afterwards, happening to visit the Middlesex Hospital, I was taken by Dr. Watson to see a case of diseased heart, which he was watching with some interest, and I immediately recognised poor Aikin as the subject of it. He had experienced another attack of rheumatism, which, as usual, had greatly augmented all that the heart habitually suffered. The rheumatism had now passed away, yet fever still remained, and with it a severe præcordial pain. But the heart had almost lost its endocardial murmur, and its impulse could hardly be felt. It fluttered and faltered, and its contractions were all too weak to make its murmur clearly audible. He lingered a few days longer, and then died, as if from exhaustion.

I was permitted to be present at the examination of the body, and these were the most important appearances which presented themselves. The cavity of the pericardium was entirely obliterated by the most close and intimate adhesion: the

pericardium seemed one with the heart, no visible trace of lymph any where remaining as the medium of their union, except opposite the right auricle. And here, too, there was at first an appearance of the same intimate adhesion of the opposite pericardial surfaces, with great augmentation of the muscular substance, but, upon a section of the auricle, what had seemed its proper muscular substance, was in fact found to be coagulable lymph of the firmest, densest texture, half an inch thick, and so deeply injected with blood as to have the appearance of muscle. Beginning from this situation we were able, not without much force, to separate the adherent pericardium, and to detach it entirely from the heart. It was much thickened at every part, yet not, except opposite the right auricle, by lymph heaped upon its surface, but by interstitial deposition within its own texture. Its adherent surface, now detached, was tolerably smooth, and of a deep red colour.

The muscular substance of the heart was unequally thickened, and one of its cavities only was dilated. On the right side neither its muscular substance was thicker than natural, nor its cavities of larger capacity. On the left the auricle was neither thicker nor more capacious than natural, but the ventricle was both by at least one third. In every part of the heart, both where it was thickened and

where it was not, the muscular substance was of the hardest and toughest texture, and its colour of the deepest red.

The internal lining of the heart was universally of the same deep red colour, and so was the lining of the aorta. The mitral valve and the semilunar valve of the aorta, were a little thickened and puckered.

A small quantity of bloody serum was found in both cavities of the pleura, and on both sides there was a partial and slight adhesion of the lungs to the ribs. The lungs were full of bloody serum. In parts they cut as if they were solid; but still they were every where pervious to air, for every part floated in water.

Now there is such a thing as reading disease backwards, if I may so say. And a very profitable method it sometimes is. For reading it in the ordinary way we may not have made out the matter to our perfect satisfaction, and may have great need of this retrospect to elucidate it. What I mean by reading a disease backwards is, having its results before us and trying to unravel their series and sequences, and so to interpret the time of their occurrence and to assign them a relation to past events of its clinical history; to learn what took place last or yesterday, and had a share in the process of dissolution, and what took place earlier and had to do with antecedent attacks, and what took place earlier still, and was

the rudimental change which accompanied the first transition from health to disease. In this way disease is traced back from its end to its beginning by the prints or vestiges it leaves of itself during its progress.

The changes of structure, appertaining to the heart in the case just related, were very numerous and complex, but their meaning was construable enough. They were all reducible to three distinct forms, those which arose last of all and at the very end of the disease, and those which took place at its mid-periods, and those which came first of all and at its beginning.

First, there was the deep red tinge at every part of the organ, the entire saturation with injected blood of all that remained to it which could be called healthy, and of all that was added to it by disease. And this unquestionably denoted the closing effort, the last work of disease within the blood vessels, bearing simultaneously with fatal force, both upon the lungs and upon the heart; and this was the immediate cause of death.

Secondly, there was the great mass of hard tough lymph encasing the right auricle, and the interstitial thickening of the pericardium, and the remarkable induration of the entire muscular substance of the heart. And these were probably the results of the several renewed attacks of inflammation, each augmenting the heart's unsoundness, by adding something of the same morbid

species to what there was before, depositing fibrine upon fibrine, and interlacing it more and more with the membranous and muscular textures, and so spoiling them.

And, thirdly, there were the close union of the pericardium with the heart at every part, except opposite the right auricle, and the thickened and puckered mitral and aortic valves. And these were probably the results of the earliest attack of pericarditis and endocarditis. The inflammation ceased and never afterwards returned to the endocardium. The beads of lymph were absorbed or thrown off from the valves, and where they had been the surfaces were left uneven. But this amount of injury which was done by the first inflammation was never afterwards augmented in the least degree. And the inflammation ceased too, and probably never afterwards returned to the pericardium at the same part or after the same manner. The serum and lymph were absorbed, and there followed a close adhesion of its opposite surfaces which nothing afterwards disturbed.

All these several changes of structure found in a single heart, which we have been commenting upon, were none other than the immediate effects of the first and of each subsequently renewed inflammation, or rather the very work of the inflammatory processes themselves.

But there was yet something more in the same heart, something noticeable enough but not to be

particularly dwelt upon in this place, the augmented capacity and augmented bulk of the left ventricle. These were not the work of any inflammatory process. They were no disease in themselves, but the remote mechanical results of disease. Of such we shall speak hereafter.

LECTURE XXI.

THE UNREPAIRED EFFECTS OF ENDOCARDITIS AND PERICARDITIS BOTH CONSTITUTE A PERMANENT UNSOUNDNESS OF THE HEART IN THEMSELVES, AND BECOME THE POSSIBLE ELEMENTS OF FURTHER UNSOUNDNESS BEYOND THEMSELVES.—THE SAME MAY BE SAID OF THE UNREPAIRED EFFECTS OF OTHER DISEASES.—THIS FURTHER UNSOUNDNESS A THING DIFFERENT IN KIND.—NATURAL DISTINCTION BETWEEN THE UNSOUNDNESS FROM DISEASE, AND THE UNSOUNDNESS FROM DISORGANISATION. — SUMMARY ACCOUNT OF THE UNSOUNDNESS FROM ENDOCARDITIS ; COMPARED (BY ANTICIPATION) WITH THE UNSOUNDNESS FROM OTHER DISEASES OF THE ENDOCARDIUM.

It has been already said, that when the heart is left in a state of unsoundness by past inflammation, whether of the endocardium, or of the pericardium, or of both, two principal consequences are to be expected. Either there may be a renewal of inflammation in the unrepaired structure, or in some other structure, of the same heart ; or the unrepaired structure, remaining as it was left, may become the element of further material changes in the whole organ. The first of these consequences has been considered already. The second remains to be considered.

Now this last is much the more frequent of the

two. The first, *i. e.* the renewal of inflammation in the unsound heart, happens comparatively to few. For it is, as we have remarked, of the nature of an accident, and dependent on circumstances befalling the individual. But the further disorganization of the heart, growing out of the elementary unsoundness left by inflammation, certainly happens to the vast majority, and, if accurate measure could be taken during life, of all its degrees, would probably be found to happen almost to all. For it springs, as we have remarked, from a natural and inevitable tendency. Wherever there is unsoundness of any elementary tissue from disease, further unsoundness is (I believe) almost sure to follow sooner or later from *disorganisation*. Different as they are in their nature, there is a link of connexion between them. The first is a chief originating cause of the second. Therefore, in passing from one to the other, we do not violate but rather preserve the context of our subject.

I know not whether these terms, unsoundness from disease and unsoundness from disorganisation, be the best that could be chosen to express my meaning, but, as I shall often hereafter make use of the same, it would be well for me to state briefly what I wish to be understood by them.

Already, a good deal has been intimated respecting the unsoundness from disease, but nothing yet respecting the unsoundness from dis-

organisation. In distinguishing between them, we must try first to get a right notion of what each is in its own nature, and then to make good the link which connects them.

Now they may be characterised generally after the following manner. In both there is a material detriment done to the natural structure of the heart. When the unsoundness is from disease, the detriment is of the same kind which the same disease, be it what it may, whether inflammation or struma or cancer, would produce in every other part of the body. But where the unsoundness is from disorganisation, the detriment is of a kind proper to the heart itself, and such as never does, and never can, take place in any other organ of the body.

Again the unsoundness from disease is made up of new substances which each disease produces according to its kind, and which are different from the natural and healthy substance, and are superadded to it or are substituted for it: or it results from a simple destruction of the natural and healthy substance. But the unsoundness from disorganisation consists in alterations of bulk and size and shape and capacity, no other causes being engaged in bringing them about than those which are constantly at work within the healthy heart, viz., its own vital movements; only they are now at work with more or with less energy than is either natural or

healthy, or they are at work without their natural and healthy harmony.

But what is it that can rouse the vital movements of the heart to a greater energy than natural, or subdue them to a less, or can disturb their natural harmony? It must be something within or without the heart amounting to a physical necessity. When it is within the heart, the previous injury of some of its elementary tissues from disease is that necessity. And hence is formed the link of connexion between the unsoundness of disease and the unsoundness of disorganisation. When it is without the heart, the ailments or injuries of other organs originate the necessity, and then convey it through the vascular system or the nervous system, and so make it felt in and by the heart. Let this serve for a brief sketch of what is meant pathologically by the heart's unsoundness from disease, and the heart's unsoundness from disorganisation, and the essential differences which separate them.

But our business is first with the unsoundness of *inflammation*. For we are pursuing endocarditis and pericarditis to their consequences. Nevertheless, we must follow the subject as it naturally expands itself, and be careful of handling it too exclusively. Inflammation, as to the manner in which it furnishes the element of disorganisation, illustrates the operation of every other disease which is also capable of furnishing

it; and every other disease illustrates the operation of inflammation in the like respect. And for this very reason they must be considered together.

Well then, has all been said that need be said of this structural unsoundness of the heart in both its kinds *pathologically*, and may we now proceed at once to clinical history, and clinical diagnosis and treatment; to what these things are and whence they come and how they show themselves and what they need and what they will bear in the *living man*? Let us pause awhile and consider; for if any further explanations of a general sort be needed preparatory to a just comprehension of what is to come, this is the place for them. And I believe they *are* needed. Such explanations now given will save us much time and many words and many a troublesome digression. For this structural unsoundness of the heart in both its kinds brings us to that class of its affections, before announced*, which are “secret and chronic in their growth and unalterable and irremediable in their nature.” And I have already promised to beware of treating them too much at large.

But it is the knowledge of their *living* forms that we especially desire to be conversant with. And this knowledge is not a whit the less pathological, because it is pre-eminently practical.

* Vol. I. p. 89.

Yet I cannot manage to display it as clearly as I could wish without first entering into details which are pathological in the stricter and more technical sense ; without first asking of morbid anatomy what it has to tell of the effects of inflammation within the heart when they have become permanent from a failure of perfect reparation, and of its effects both permanent and cumulative from several accessions of inflammation and from several failures of perfect reparation ; and also of the effects of other disease within the heart, which is not inflammatory ; and further what it has to tell of alterations of size and bulk and shape and capacity in the heart. The former will include all that *materially* belongs to unsoundness of the heart from disease in its several degrees from the least to the greatest ; the latter all that *materially* belongs to its unsoundness from disorganisation in its several forms from the simplest to the most complex.

Still I am not going to give an inventory of a whole museum, but only to choose the fittest specimens to represent the kind of things with which we have to do, and the fittest to mark their reality, a reality, which now, when we are approaching those parts of our subject which we must be content to generalise, will often need to be borne in mind, that it may keep us to tangible points and withhold us from running oft into mere speculation.

It has appeared that out of sixty-three cases of endocarditis, reparation was perfect in seventeen: for in them the murmur ceased entirely. And that reparation was imperfect in forty-six, for in them the murmur continued while life was safe for the present.* But it is not from these forty-six cases that I must draw my information of the nature and effects of an unsound endocardium, but from those which I have casually met with in the course of years.

By the description already given of the damage which endocarditis is capable of doing, it has been seen how great it is in some cases and how small it is in others, and consequently how much is left for reparation to effect in some and how little in others, whether the result be the restoration of the membrane to perfect soundness, or only the diminution of its unsoundness to a degree compatible with life. Our present business is with the latter result.

In looking over such records as I possess, of dissections made where death had taken place at various periods of many months or of many years after the attack which did the original detriment to the endocardium, I find that the morbid appearances may be reduced to a few, to opacity and thickening of the membrane, to marks of perfect and imperfect cicatrisation,

* Vol. I. p. 147.

and to breach of surface or solution of continuity.

The opacity and thickening vary much in their extent. Sometimes they are confined to a single valve or to part of one only, to its free edge; sometimes they affect more than one, generally two, the mitral and the aortic valves; and they occasionally extend to the valves of both sides of the heart, and pervade both their proper membranous expansions and the tendinous cords proceeding from them. Further, this same opacity and thickening belong sometimes to other portions of the endocardium beside those which form the valves and their appurtenances, especially to the lining of the left ventricle nearest the aorta and to the whole lining of the left auricle.

Beside such general opacity and thickening a particular valve sometimes presents a hard elevated line or ridge where it is especially thickened, or a small spot where it is indented or depressed, looking like a complete cicatrisation in one case and an incomplete cicatrisation in the other.

Sometimes a valve is perforated or cribriform or it wants a portion at its edge, or a tendinous cord is snapt in two and its ends are hanging loose within the cavity of the ventricle.

If this be a true sketch of the heart's permanent unsoundness derived from the imperfectly repaired effects of endocardial inflammation,

and this its different extent, and these its several forms, and these its situations in different cases, you will see that the blood must thenceforward always encounter some impediment in its passage through the heart. And you will see too how various must be the amount of that impediment, how in one case it must be great and in another next to nothing, and you will be prepared for the various fate of those who owe the first damage of their heart to a rheumatic endocarditis.

All this is obvious enough. But belonging to the same district of pathology there are certain conditions which are less obvious and which, as far as I know, have never been noticed at all, but which I desire particularly to insist upon, on account of their great practical importance. Indeed they need to be pointed out as lights and signals to steer by, when we come to contemplate, in the living man, the effects both immediate and remote of the heart's unsoundness derived from endocardial inflammation, and when we are required to treat them and to give opinions about them.

This then I believe to be a fact which, if not true in every instance without exception, is true in the majority, viz., that, after inflammation of the endocardium has ceased, and reparation has done its best, and all that is reparable is repaired, whatever remnant of unsoundness be left, it continues ever afterwards without increase *in its own*

kind. After the lapse of years the very appearance of all we find seems to testify that it has long been stationary. There is no vestige of changes recently in progress, no new growths mixed with old growths; each cicatrix is an old cicatrix, each perforation an old perforation; all looks as if it bore the same date, and had been brought to pass simultaneously. And hereafter, when the results of clinical observation are compared with those of morbid anatomy, they will be found to testify the same thing.

The unsoundness left after endocardial inflammation remains (I say) without increase in its own *kind*. What is thickened does not go on to be thickened more and more. What is cicatrised does not go on granulating. Perforations and breach of surface do not become larger and larger. All this I suspect could only come from a renewal of inflammation in the endocardium. But inflammation naturally comes to an end, and when it has once ceased, there is not, I suspect, any natural principle of growth in the things which it leaves behind enabling them to increase of themselves. And herein inflammation and its effects will be found contrasted with other diseases of the endocardium and their effects, such I mean as produce deposits of cartilage, atheroma, and bone. Here either the diseases do not naturally come to an end, or their effects have a natural power of growth within themselves. For carti-

lage, atheroma, and bone go on increasing indefinitely. No doubt great structural damage is sometimes involved in the unsoundness which remains after a single attack of endocarditis. But upon the whole it is not apt to be carried to an extreme degree. When an orifice of the heart has undergone extreme stricture, when the mitral orifice for instance has been so narrowed as not to admit the passage of a finger, I have commonly found that the clinical history of the case has not assigned its beginning to any certain period or to any known attack of inflammation; but it has testified on the contrary that the symptoms referable to the heart arose and increased covertly and gradually, until they reached an intolerable amount. The utter detriment and spoiling of the valve appertaining to the orifice, and causing its extreme stricture, is not the stationary remnant of unsoundness left by an attack or two of accidental inflammation, but the progressive growth of unsoundness built up by a never-ending chronic disease.

Further, it has already been stated, as a very general fact, that the louder the endocardial murmur the less is the amount of valvular impediment. Now, in almost all cases where the heart's unsoundness is traceable back to an attack of rheumatic endocarditis, the murmur is apt to be peculiarly loud. In such cases then the inference would be, that the valvular impediment is

not great. It is remarkable moreover that the instances which have furnished me the proof of this fact — of the louder the murmur the less the impediment — have been chiefly where the heart-affection has originated in acute rheumatism.

But be it remembered, that a further mischief to the heart is always expected to follow the imperfectly repaired injury or remnant of unsoundness left by endocarditis. But it is a mischief different in kind, another sort of injury altogether; it is the unsoundness of disorganisation grafted upon the unsoundness of disease. This will be considered in its turn.

LECTURE XXII.

CONSEQUENCES TO LIFE AND HEALTH FROM THE PERMANENT UNSOUNDNESS OF THE HEART REMAINING AFTER ENDOCARDITIS.—1. CASES IN WHICH BESIDE THE PERMANENT ENDOCARDIAL MURMUR THERE IS NO OTHER SYMPTOM REFERABLE TO THE HEART; 2. CASES IN WHICH BESIDE THE MURMUR THERE IS OCCASIONAL PALPITATION; 3. CASES IN WHICH BESIDE THE MURMUR THERE IS CONSTANT PALPITATION.

HAVING considered that form of permanent unsoundness of the heart, which consists in the unrepaired effects of endocarditis, we are prepared to pass from the nature of the thing itself to its living consequences.

The endocardial murmur having become permanent, and denoting (as it undoubtedly does) permanent injury of some portion of the endocardium, it becomes most interesting to enquire what follows; what detriment either immediately or in process of time results to the health and well-being of the patients. In some no detriment whatever immediately results. Together with the permanent endocardial murmur they suffer neither pain nor palpitation nor any sort of distress or embarrassment referable to the heart under any circumstances. Their disease is no affair of their

own consciousness. The physician hears something but they feel nothing; they believe themselves well, but the physician knows that they have an injured portion of the endocardium.

Now the severest and the mildest cases of endocarditis have equally this termination. The fever, pain, and swelling of the joints, may have been excessive, and anguish and distress of the chest and palpitation and fluttering of the heart may have kept life in jeopardy for many days. But these may all pass away, and nothing remain except the endocardial murmur.

Or the fever, pain, and swelling of the joints may have been barely enough to characterise the disease, and there may have been no symptom, either pain or anguish or palpitation or fluttering, which could denote that the heart had any share in it, save only the endocardial murmur. But this never ceases.

Here then is a certain injury of the endocardium, which the heart bears patiently and unconsciously, neither feeling it nor resenting it for the present. But what in process of time is the event of such cases?

You may think perhaps that my experience should be ample enough to tell you all that can be known concerning them. But indeed it does not reach so far in this matter as you might at first suppose. It is true that I have witnessed the original disease in a great multitude of individuals,

and I have seen its symptoms dwindle down to the single one in question. But the vast majority of those discharged from the hospital still bearing this symptom have escaped entirely beyond my observation, and I have never seen or heard of them more.

Some however have again fallen in my way, and thus I have been able to pick up certain particulars of information which it may be useful for you to know.

It has not unfrequently happened to me, when I have been examining patients at the hospital, to find the marks of former leech bites or the scarifications of cupping glasses upon the præcordial region; and this circumstance, and not any complaint of their own in this quarter, has led me to apply my ear to it, and thereupon I have discovered the endocardial murmur. Inquiring when and why it was they had need of leeches or cupping to this part, I have learnt from them that it was when they had a rheumatic fever, and because at that time something was the matter with their heart. But this happened years ago. They got well, and from that day to the present they have remained without palpitation, or shortness of breath, or any inconvenience whatever referable to the heart, which they were at all conscious of.

In these individuals there can be no doubt that the condition of the endocardium, which now

gives occasion to the murmur, had its origin in inflammation coincident with the attack of rheumatism to which they refer. Indeed some of them I have recognised as having been my own patients, and turning to my record of their former malady I have found the fact to be just as they have stated it. They suffered acute rheumatism in the course of which the murmur arose. The rheumatism ceased but the murmur remained, and they finally left the hospital carrying with them the still audible murmur. Between the origin of the murmur dated from the attack of acute rheumatism and the present time when it is found still to continue, there has been in the several cases an interval of one, two, three, four and five years, and in the meanwhile the patients, most of whom have been engaged in occupations needing bodily exertion, have been unconscious of ailment.

The cases in question convey this piece of consolatory information, that while there is no doubt to what disastrous results the injury of the endocardium naturally tends, it does not go on at once and of necessity to produce them, but that, between the elementary morbid process and the results which are most expected and most feared, there may be a suspense of years. For even under the unfavourable conditions which belong to a life of hard bodily labour, such permanent organic changes of the endocardium as are left by acute inflammation and denoted by the murmur

may exist for five years without the least consciousness on the part of the patient, that he has any disease of the heart.

But what is the actual condition of the heart in such cases? Whatever was the condition in which it was left after the original attack of acute rheumatism, the same (there is reason to believe) is its condition now. The physician then heard the murmur, and now after the lapse of years he hears the same, but discovers nothing more; and so he has no grounds for believing that further detriment has arisen to the organisation of the heart even after the lapse of years. He knows that there is an injured portion of the endocardium but he knows nothing more.

Now where the heart bears the injury of its endocardium thus patiently for years, it is fair to infer that that injury is either so small or so fortunately placed, as to offer no sensible obstruction to the passage of the blood. A little ridge on the surface of a valve, a little granule on its free edge, or a little thickening or shortening of a tendinous cord, may be conceived capable of occasioning eddies and vibrations of the blood which can be heard, without producing any hindrance of its current which can be felt.

Of all those who suffer rheumatic endocarditis and recover but with some permanent detriment done to a portion of the endocardium, a large

proportion, I suspect, fall under the foregoing description.

This fact then is ascertained and confirmed by experience, viz., that the damage done to the endocardium by rheumatic inflammation may abide for four or five years without producing any conscious detriment to the health or well-being of the patient, or (as far as we have the means of judging) any farther injury to the structure of the heart. And it is a most important and consolatory fact. But in other instances other results immediately follow. When after its departure acute rheumatism leaves the endocardial murmur behind it, which, though known only to the physician, is the sure sign of injury done to the endocardium, it leaves it attended from the beginning by other symptoms, which the patient is sufficiently conscious of, and these are directly referable to the heart. They consist of palpitation, and some pain, and some dyspnœa, which are not constantly present, but only under bodily exertion and mental excitement. The child who has had the præcordial murmur ever since it suffered a certain rheumatic attack, is just the same child it was before, except that it cannot join in any pastime requiring rapid movement: for then its heart palpitates, it loses its breath and is obliged to sit down. Men too are just the same men they were before, only perhaps they cannot run up stairs without panting and hurry, and they con-

stantly find themselves obliged to restrain their bodily efforts within certain limits, and to beware of mental excitement, for fear of palpitation and dyspnœa.

These conditions too may remain for years without either augmentation or abatement. The murmur is never absent, but the palpitation and dyspnœa are never present except as the immediate effect of a certain amount of bodily exertion or mental excitement.

Among the cases of rheumatic endocarditis whose history I have investigated, the instances have been very numerous in which I have found a space of from one to five years immediately succeeding the original attack exempt, according to the patient's own account, from all ailment except an occasional palpitation and dyspnœa. This exemption however has been favoured by peculiar circumstances, by a daily occupation not requiring bodily labour and free from the greater cares and hardships of life. The patients have been men of sedentary professions or they have been young people, the children of parents in easy circumstances. I have lately seen a young lady thirteen years of age, whom I attended three years and a half ago under an attack of acute rheumatism attended by endocarditis. The symptoms during the attack referable to the heart were completely characteristic of the disease, and carried to such extremity, as to keep life in peril

for several days. It was perhaps the severest case I ever saw recover. She did recover however, but never lost the murmur and occasional palpitation. At present she has the appearance of perfect health. She even bears the marks of premature womanhood. She goes to school, plays about like other girls, but cannot run so fast or so far as the rest or use bodily exertion beyond a certain amount without dyspnœa and palpitation, and some pain in the region of the heart. For all other purposes she is absolutely well. In examining the state of her heart when she is quite free from all excitement, I find no extraordinary impulse, either of extent or of degree. It is felt only at the apex. Neither do I find any extraordinary extent of dulness to percussion. A systolic murmur is audible every where within the præcordial region, most audible at the apex, more faintly at the basis. From the basis upwards towards the right clavicle in the course of the aorta and subclavian artery it is entirely lost, towards the left clavicle and in the course of the pulmonary artery it is very loud, but not at all heard in the carotids. From the apex the murmur extends far round towards the left axilla and the back. Here I presume that the rheumatic inflammation has done a permanent injury to the endocardium on both sides of the heart, and that the mitral valve and the semilunar valve of the

pulmonary artery have undergone change of structure.

I have already said that I have known numerous instances of a permanent endocardial murmur, which had its origin in an attack of acute rheumatism, existing for various periods of from one to five years, without any consciousness of ailment except at times of bodily and mental excitement. If the patient's own testimony may be taken to fix the origin of his disease (and there is no reason why it should not), I have seen one instance where these conditions existed for 20 years. A clergyman, 39 years of age, worn out by the cares of his parish, pale, and thin, came to me, and recounted a long catalogue of nervous distresses. He complained too of palpitation of the heart upon any great bodily exertion, or mental excitement, and after stimulant food. And this palpitation I thought would turn out to be nervous too; but auscultation found the loudest endocardial murmur at the apex, and at the basis of the heart, and in the carotid arteries. I fancied there was also a slight excess of impulse, but of this he himself was unconscious at the time, and said he never felt it when quiet, as he then was. Percussion discovered no unnatural extent of dulness in the præcordial region. In truth I was sure of nothing extraordinary appertaining to the heart but the murmur.

Now this gentleman reported that once in his

life, twenty years ago, he had suffered an attack of acute rheumatism; that his heart was said to be affected at the time, and he had remedies applied to it, and that from that day to this he had ever been liable to palpitation, not constant, but occasional only, and the inevitable consequence of excitement.

Thus we have been contemplating two conditions which are the result of rheumatic endocarditis; one in which there is a permanent murmur, without the least consciousness of ailment on the part of the patient under any circumstances, and without the least evidence furnished to the physician, from auscultation, of further detriment done to the heart (beyond the original injury of the endocardium) after the lapse of years. The other in which there is a permanent murmur with palpitation and dyspnoea which are occasional only, yet inevitable upon a certain amount of excitement, and still without the least evidence of increasing detriment to the heart, even though years had passed since the original injury of the endocardium.

What then is the essential difference between these two orders of cases? It is probable that the difference respects only the degree of injury sustained by the endocardium. This is not great in either case; but less in the first, where it is enough to produce an eddy of the blood and a vibration among its particles, and a consequent

unnatural murmur, yet not enough to occasion such a sensible obstruction to its current as the heart either feels or resents ; and greater in the second, where, under ordinary circumstances, it is still not enough for the heart either to feel or to resent, but, when an occasion of accelerated motion arises, it both feels it and struggles against it as an obstacle.

There is yet another description of cases, including those who have a permanent murmur derived from acute rheumatism, and together with it a permanent palpitation. After the subsidence of the rheumatic attack, the patients may recover the aspect, and many of the feelings and functions of health ; but their heart is *always* found to beat with somewhat more than its natural force, and with very much more upon any considerable exertion. Now, from this palpitation, conjoined *from the first* with the permanent murmur, I do not know that we can justly infer that the heart has sustained *from the first* a detriment to its structure beyond the injured endocardium. But in such cases, we are apt to think that we shall not have long to wait for the authentic signs of its more extensive disorganization, and we are apt to look for an earlier incapacity and an earlier death. Yet this need not be : even here the changes for the worse are often very slow. Life, useful and enjoyable life, may endure for years, even (as the following case will

show) for twenty-two years, and then afford the prospect of enduring still.

A lady thirty-six years of age, thin and pale, was brought to me by a medical man for consultation upon all the circumstances of a very long abiding malady. The impulse of her heart, always excessive, was augmented to violence upon any exertion. She suffered dyspnœa when she moved about, but no cough, and no expectoration, except on occasion of an accidental catarrh. Her bowels were regular, and other functions were proceeding naturally. On examination of the chest, the lungs were found to admit air freely. The heart was felt beating at every part of the præcordial region, and an endocardial murmur accompanying its systole was heard at the basis, and thence becoming louder and louder as it was conveyed downwards towards the apex, and feebler as it was conveyed upwards in the course of the aorta. It ceased abruptly before it reached the subclavians, and was inaudible in the carotids. It was loud in the left axilla, and every where in the back below the scapulæ.

Now what was the history of this case? At the age of fourteen this lady had an attack of acute rheumatism, and she perfectly recollected the palpitation which she then suffered, and the remedies which were addressed to her chest. From that time forth her chest had never been at ease. At the age of eighteen she had a second attack of acute

rheumatism, but the habitual symptoms referable to the heart were neither aggravated at the time nor rendered permanently worse afterwards. Ten years ago she had a third attack, which for the time brought upon the heart an extraordinary amount of suffering, but left it no worse than it was before.

This lady married at thirty. She had had one living child and several miscarriages. She had suffered a miscarriage nine weeks before I saw her, with considerable hæmorrhage, and from that time her palpitation had been unusually severe.

I enjoined perfect quiet, and recommended that her nervous system should be kept constantly under the soothing influence of paregoric and ammonia.

I saw her a few weeks afterwards. She had lost her pale distressed look; and herself and her medical attendant both declared that what she then was might be taken to represent her habitual state. All the unnatural sounds of the heart, which I had found before, still remained, and nearly the same excess of impulse. I considered that the mitral valve was unsound, and that the left ventricle was in a state of hypertrophy and dilatation, and the aortic valve not altogether uninjured.

Taking then the three descriptions of cases in their order, I believe it to be the tendency of each to pass progressively onward into the others.

The endocardial murmur left by acute endocarditis may be simple and alone, and so it may remain for years, but it is ever apt to have a palpitation added to it. The palpitation accompanying the murmur may be occasional only, and so it may continue for years; but in the mean time, it is ever ready to become permanent. The permanent palpitation may remain for a while moderate in degree, but it is always tending to become greater and greater. Of these three conditions, then, the best that experience allows us to hope is, that each may remain stationary: for their changes are never retrograde, but always progressive and always for the worse. Each condition becomes worse as it is converted into the other, and the condition of permanent palpitation passes on to new results, and to the final and fatal event.

The nature of these results will be considered hereafter. In the mean time, remember the important fact which clinical experience has just been brought to testify. It is this—that the evil consequences to life and health arising out of the heart's permanent unsoundness left by endocarditis are often either stationary at a small amount for years, or very slow to advance and accumulate. If a reason of the fact be asked, it will be found in the stationary and unincreasing nature of the original endocardial unsoundness.

LECTURE XXIII.

PERMANENT UNSOUNDNESS FROM PERICARDITIS; ITS MANY DEGREES; SOME HARMLESS.—GENERAL VIEW OF THE EFFECTS OF PERICARDITIS AND OF THEIR REPARATION.—HOW ULTIMATELY INCOMPLETE AND ENDING IN PERMANENT UNSOUNDNESS OF VARIOUS DEGREES.—SOME OF THEM SPECIFIED AND COMMENTED UPON.—CUMULATIVE UNSOUNDNESS FROM SEVERAL ATTACKS OF PERICARDITIS.

WHEN pericarditis has ceased and life is safe for the present, auscultatory signs cannot be appealed to for information respecting the state in which the pericardium is left, as they were after endocarditis respecting the state of the endocardium. The perfect or imperfect reparation of the pericardium cannot be inferred from the entire cessation or the permanent continuance of the exocardial murmur. In truth there is no such thing known (I believe) as its permanent continuance. If life go on, its cessation must follow, whether the pericardium be restored to perfect integrity of structure or not. Being perfectly restored, the healthy surfaces would again glide upon each other freely and without sound. Being imperfectly restored, the unhealthy surfaces would adhere and so abolish the sound

which had resulted from their friction. A stop is put to the murmur in both cases, and its cessation proves nothing in either.

From the description already given of the damage which pericarditis is capable of doing, its amount will be seen to vary greatly in different cases. Accordingly, reparation has much or little to do in different cases before it reaches (I will not say) perfect soundness, but that degree of diminished unsoundness, which makes life safe for the present. It is with the last that we are now concerned.

So much of the effects of pericarditis, as, after they have admitted reparation to the utmost degree of which they are capable, is still found to remain permanently and unalterably, this it is which in each particular case, be it more, or be it less, constitutes the unsoundness.

But when reparation has done its best, how much is actually found to remain? More or less in different cases, but something, I suspect, in all. I am disposed to take it for a fact, that whenever inflammation of the pericardium has been enough to declare itself by symptoms, the detriment done never undergoes perfect reparation; the pericardium never regains its integrity of structure, never, in short, again becomes what it was before it was inflamed. And in as far as it falls short of it, so far, it is permanently unsound; and this may be very little, or very much.

What then is the nature and what may be the degrees of the heart's permanent unsoundness derived from the partially repaired effects of pericardial inflammation, now come to be considered.

There are often found after death, where they have been unsuspected and unlooked for during life, small adhesions of the pericardium, of which the heart never felt the injury, the result of some slight attack of inflammation of which it never felt the presence or the pain. They consist of long loose bands running between the heart and the pericardium, or of a few slender threads between the pulmonary artery, and the aorta. Some of these Mr. Paget never fails to discover, wherever there are white spots upon the heart, and from the coincidence of the two, he has drawn the sound conclusion that both are the effect of inflammation; inflammation however, of which there are commonly no traces in the history of men's lives, to match these sure and authentic ones met with after their deaths.

Here the unsoundness, which consists in the adhesion, is of the least possible degree. Yet unsoundness it must still be called, unfelt as it is and harmless; for it displays the effects of a bygone inflammation imperfectly repaired. But I can make no use of these cases practically.

Again, there has been sometimes found after death, where, during life, nothing has given the

least suspicion of its existence, one universal adhesion of the pericardium, and its cavity entirely obliterated. I have myself known a few such cases. No symptom during life has pointed to the heart and the disease that immediately killed the patients has belonged to other organs. They have however been casual cases, and I had no acquaintance with the conditions of the patients' health, prior to their fatal illness. My observation of them had only been during the last few weeks of their existence, when, if ever, a damaged organ is apt to betray the secret of its unsoundness. But even then, the heart had escaped my suspicion, and after death it disclosed what I never looked for. The cavity of the pericardium has been entirely obliterated by adhesion. Further the adhesion has been effected with the least, or with hardly any, apparent medium of adventitious substance. And, further still, the muscular structure of the heart has been neither thickened nor attenuated, nor any of its chambers unnaturally large or small. Except the complete adhesion of the pericardium and the obliteration of its cavity, the heart has been altogether normal and healthy.

Now these cases I can indeed turn to a practical use. I find in them the explanation how it sometimes comes to pass, that the most acute pericarditis has its termination, not merely in present safety, but also in (what, at least during life

cannot be distinguished from) perfect health. I have known a few cases, and a few others have been credibly reported to me, of individuals, who having suffered an unequivocal attack of pericarditis, have, after the lapse of some months, betrayed not the least evidence of an injured heart, and who, in every feeling and function of their bodies, have been as perfectly well as ever they were. But in these cases did the pericardium recover its perfect structure, and were its surfaces everywhere ununited and freely moving upon each other again? I doubt whether this be possible. Or did the pericardium contract a complete and permanent adhesion to the entire obliteration of its cavity, and that by the least conceivable quantity of adventitious lymph? I know that this is possible from the cases to which I have referred, and I know too, although it be a state of imperfect reparation or unsoundness, yet that it is compatible with the perfect functions of the organ, and need not lead to its further disorganisation.

Take one case in illustration.

Louisa Hawkins, a young married woman, twenty years of age, was admitted into St. Bartholomew's Hospital, on the 23d of June, 1836, suffering from acute rheumatism. Almost all her larger joints were swelled, and red, and painful, and had been so for three days; her left side, too, was painful, and she had short breathing and a dry

cough; and withal her heart beat with a genuine exocardial murmur. Her fever ran very high, and her disease altogether was very severe. She was treated by cupping and leeches, and by calomel and opium.

The exocardial murmur preserved its distinctive character for five days; and then for five days it was sometimes present and sometimes absent, and varied in different postures of the body, and then it went away altogether, and left the sounds of the heart perfectly healthy and natural. It took a fortnight from the patient's admission to bring her disease to a close; and then she remained three weeks longer under our observation receiving such helps from medicine as her weakness and her shattered nervous system required. At the end of five weeks she was still weak but gaining strength daily, her heart beating with unnatural frequency but without the least unnatural sound.

This was considered to be a case of simple pericarditis, very severe in degree, but arrested by active treatment before it had gone on to produce a large accumulation of lymph. Hence severe as it was and severe as were its remedies and great as was the constitutional suffering, the actual detriment done to the heart was probably not large and the powers of reparation were not highly taxed.

In the month of February 1837 this young

woman came to the hospital to pay a visit of gratitude to the sister of the ward. I saw her. She was the picture of health. She told me that she soon recovered her wonted strength after she left us and that she had been unconscious of the least ailment ever since, and that there was nothing in the way of bodily exertion which she could have done before her illness that she could not do now. After the most careful auscultation bestowed upon her heart by myself and others we could find no fault with it. Its contractions, sounds, and impulse were rhythmical, healthy, and natural, and the præcordial region afforded its due resonance to percussion. (W. 21. 33.)

This is indeed an encouraging case. Here was no slight or covert or doubtful disease but one having a sure living diagnosis, a manifest pericarditis, acute and perilous and depositing lymph upon the surface of the heart. It was treated as such, and its symptoms were abolished and life was saved for the present. Nay! more, after the lapse of eight months every circumstance, which could be taken into account, declared that health was perfectly restored, even the health of the heart, as far as the perfection of its living functions constitutes its health.

In what proportion the genuine cases of acute and lymph-depositing pericarditis, duly and seasonably treated, revert to the conditions of this case, I have no statistics to inform me. But,

standing alone the case gives an encouraging lesson. It is this, that we should always keep those who have suffered the disease as long under our care and observation as possible. Even when reparation has reached the point at which life is safe, we should not yet abandon them. How much further it may go we cannot tell; therefore we should be ready to give to it every aid and to avert from it every hindrance. We are not sure that it can go so far as to leave the heart perfectly sound of structure. But we *are* sure that it can go to the extent of reducing its unsoundness to so small an amount as to be unfelt as a detriment to the heart's living functions.

But the reparation of the injury done by pericarditis is too often neither thus really nor virtually perfect, but leaves unsoundness enough to be always felt, and enough to become the element of future disorganisation.

The more painfully interesting and (I fear) the larger part of the subject remains. Of this some summary account must be given, viz. of reparation beginning and proceeding but falling short of its ultimate design, and of unsoundness diminished indeed and brought within limits compatible with life, but felt as a present injury and feared as the source of greater injury to come.

Consider the effects of pericardial inflammation. They are the undue determination of blood to the membrane itself, the fluid effused within

its cavity and the coagulable lymph adhering to its surface. And then consider how each of them becomes of greater amount in proportion as the inflammation is more severe and of longer duration. Yet, if life be spared after the inflammation has ceased, you may always trust the powers of reparation for the entire removal of the two first, but not of the last.

The removal of the undue determination of blood is the first and the easiest stage towards reparation. Vessels, which naturally contain few red globules, have been distended and overloaded with them, and those, which naturally contain none at all, and are therefore invisible, have admitted them freely. All this results from something (*sui generis* perhaps)—something done or suffered by the blood-vessels and essentially ministering to the part they have to play in the inflammation. And it all ceases when the inflammation ceases as a natural and necessary consequence without (as far as we know) any further organic process whatever.

The second stage is not so easy, but yet not difficult. It is the removal of the effused fluid. This however must be entirely removed before the heart can reach any condition which is compatible with the continuance of life, even a *safe* condition of permanent unsoundness.

The third and last stage towards reparation is the most difficult of all, and doubtful whether it

be ever completed. This is the removal of the solid lymph. Removed altogether (I suspect) it never is, and what remains of it, after reparation has done its best, constitutes the permanent unsoundness.

But the solid and fluid products of inflammation within the pericardium bear a certain relation to each other in the process of their removal. Therefore we will take them both together in considering how it comes to pass.

Inflammation having ceased but lymph still abiding upon the surface and serum within the cavity of the pericardium, the best event, now to be presumed possible, is that its opposite folds should adhere and its cavity be entirely obliterated. And this adhesion is unquestionably a process of reparation; of tentative reparation if you please, but still of reparation. It does not succeed in bringing back sound and healthy structure, but it *does* succeed in rendering the effects of the disease less intolerable, and less incompatible with the continuance of life, than they would have been if no such adhesion had taken place.

Now adhesion between the opposite surfaces of the pericardium takes place in the same manner and through the same medium as between the opposite edges of a wound, and it is hindered or retarded by the same impediments. Bring the edges of a wound together and they adhere.

Keep them apart, and they cannot adhere, although the lymph be ready formed to serve as the medium of their adhesion. And as soon as the opposite surfaces of the pericardium, being already coated with lymph, are fairly applied to each other, they begin to adhere. But a large quantity of serum accumulated within its cavity, and holding its surfaces at a distance from each other would preclude for the time the possibility of their union. And the quantity of serum may be large indeed.

Large however in point of fact it seldom is. It would almost seem among the characteristics of inflammation, when it falls upon the pericardium, that its solid should greatly exceed the amount of its fluid products. In our clinical diagnosis of pericarditis, the important fact was particularly noticed, that the exocardial murmur, the sure evidence of solid matter rubbing against solid matter, was heard early and continued to be heard in almost every case without intermission, until it finally ceased altogether; and the fact too that, however soon after its final cessation the patient died, the pericardium was found beginning to adhere. Thus the fluid within the cavity seemed from first to last not enough absolutely to prevent the opposite layers of lymph from coming in contact.

No sooner is this fluid, whether it be much or little, absorbed and gone, than the solid matter is

left to contract adhesion, as it may and as it does, forthwith.

Now this process of adhesion begins with a larger or smaller quantity of coagulable lymph according to the extent, the intensity and duration of the previous inflammation. But whether it be large or small, the quantity with which the adhesion begins is probably in all cases more than is needed to render it complete and permanent. Therefore nature seeks to preserve just so much only as is essential to her purpose, and all the rest which can only be a hindrance to its perfection, she strives to remove. But this perfection which nature intends is more than nature can achieve at all times.

Any adhesion, which, occurring after acute pericarditis, enables life to go on however insecurely, and the heart to perform its functions however imperfectly, is a reparation. But the adhesion, which further guarantees the continuance of life and enables the heart to perform its functions in a manner approaching to the conditions of health, is a reparation in a higher sense. And to do this it must be of a certain kind and degree.

Be it however remembered, that all adhesion of the pericardium, whatever be its kind and degree, although in reference to the preceding inflammation it partakes of the nature of reparation, yet in comparison with original structure, and with reference to consequences, partakes of the nature

of unsoundness. Only its character of reparation is more apparent in one case and its character of unsoundness in another. The former has been illustrated by some conspicuous instances. It is the latter with which we have now chiefly to do.

The most common appearances of disease are often the fullest of instruction, and to such I am now going to refer. When there has been only one known attack of pericarditis, occurring long enough ago to allow as complete a reparation of the injury left behind as might be possible in each case, then the customary appearances on dissection are some of the following:—

1. There may be an universal adhesion of the pericardium and a complete obliteration of its cavity effected by the least, or by hardly any, apparent medium of adventitious substance. Here we have an example of reparation nearly complete but not of absolute reparation; of the least degree of permanent unsoundness but still of unsoundness. It has been shown, that these conditions may subsist without further harm to the functions and structure of the heart. But then it was where there had been no known previous attack of acute inflammation. Hence however, it was thought fair to conjecture that where there had been a previous inflammation and life had afterwards gone on without the least evidence of further harm to the functions and structure of the heart, these same were the conditions which

might have obtained. I say, "it was thought fair to conjecture" and that is all. For, although I have known a few who after simple acute pericarditis have recovered and lived apparently in perfect health, yet I have never had the opportunity of examining after death the state of the heart in any such instances. I have indeed often met with "this almost complete reparation and this least degree of unsoundness" appertaining to the pericardium after death, where inflammation had been formerly suffered. But it has been accompanied with unsoundness of the endocardium also, and further disorganisation in the shape of a thickened muscular structure, and of a dilated ventricle has been superadded, and all have been notified by symptoms during life. It is a question with me then after all, what are the consequences which naturally result to the functions and structure of the heart from simple adhesion of the pericardium. For I have not facts enough to appeal to of the sort which are required to settle it. Pericarditis indeed is common enough; but not simple pericarditis. The original disease is oftener a complex of pericarditis and endocarditis than pericarditis alone; and the original unsoundness a complex of the partially repaired effects of both. Hence whatever detriment the heart is afterwards found to suffer in its functions and organisation, it is difficult to make sure either how much is due to each, or whether the

whole may not be imputed to one ; how much the thickened valve produced, and how much the adhesion of the pericardium ; or whether the thickened valve may not have been exclusively the source of all the mischief, and the adhesion of the pericardium altogether blameless from first to last.

2. But, instead of the adhesion of the pericardium being universal, and the obliteration of its cavity complete, both may be partial only ; partial, however in different ways. There may be a single adhesion over a considerable space, limiting the one cavity by so much. Or there may be many adhesions partitioning the one into many cavities. These partial adhesions are often very firm and close, and in their interspaces the surfaces of the pericardium are found lying in contact and ununited and apparently healthy.

Now measuring and comparing things as they merely strike the eye, we see in these conditions a less amount of unsoundness, than in a pericardium altogether adherent and having its cavity altogether obliterated. But looking to consequences we must judge otherwise. These loose interspaces are prone to entertain inflammation afresh. After death from secondary pericarditis the heart has been found apparently surrounded with many little separate abscesses, which have turned out to be collections of purulent matter between the folds of the pericardium, where it had here and

there failed to contract adhesion after a former inflammation.

In the radical cure of hydrocele, more is needed, that we may make sure of it, than to draw off the fluid. Let it be drawn off twenty times, there is still a fear that it will in all probability return, as long as there remains a serous cavity for it to return to. The cavity itself must be obliterated, and surgery designs and interferes that it shall be so. It aims to produce throughout the entire sac just so much inflammation as shall cause to be deposited, not here and there merely, but on every part of its opposite surfaces lymph enough, but not more than enough, to procure their adhesion. The absolute obliteration of the cavity of the tunica vaginalis by adhesion with the least possible quantity of adventitious matter, constitutes the radical cure of hydrocele. Here what is surgically the radical cure in reference to one organ is the same, which medically in reference to another I have called "almost complete reparation and the least degree of unsoundness." Whatever be the security against recurring disease in the one case must be the security in the other.

3. But it is not only the extent of the adhesion that is various, but the quantity of the uniting medium also. Between a slender tissue that holds, almost invisibly, the opposite surfaces together, and a solid substance half an inch in thickness, there is

found every intermediate degree. And these extremes and several intermediate degrees are apt to be found in the same heart, displaying larger and smaller measures of unsoundness at different points, and a vast aggregate of unsoundness upon the whole. Now this state of things may be met with at remote periods after some known attack of pericarditis, from which there has been no return to health, but ever afterwards a sensible hurt and hindrance to the living functions of the heart and a miserable existence. The unsoundness is both permanently great and unalterable for the better. Reparation has been able just to save life, and allow it to go on and nothing more. I say unalterable for the better, but not unalterable for the worse. For here are just those conditions which involve the peril of secondary inflammation.

Such, generally, are the forms and degrees of imperfect reparation found after a single attack of pericarditis. They are in fact forms and degrees of permanent unsoundness. They are calculated to interfere some more and some less with the natural functions of the heart, some to bear heavily and some lightly upon a man's future well-being, some greatly to abridge the span of life, and some still to allow its long continuance.

But there is a cumulative unsoundness resulting from more than one attack of pericarditis. To the imperfectly repaired detriment done by a first inflammation may be added the detriment

done by a second. And this too may be imperfectly repaired; and thus, after several inflammations, each adding something to the permanent injury which it found, if life continue, the cumulative unsoundness may ultimately become enormous.

Of this cumulative unsoundness something has already been said incidentally in a former lecture, when I gave certain cases and dissections to illustrate the clinical history and diagnosis of secondary inflammations of the heart, and in the present lecture when, describing the forms of unsoundness left by a first pericarditis, I pointed out those which rendered the heart more apt to entertain a second. Hence it must appear, that there are cases in which after death the effects of a second or any after-attack of pericarditis are plainly distinguishable in the same heart from those of a first or of prior ones, the cases namely where from such second or after-attack the patient has recently died. But these show the beginnings only of that cumulative unsoundness, of which something yet remains to be said. I will content myself with first describing it simply as it appears when it has run on to some of its highest degrees, and afterwards add a brief commentary.

The adventitious substance intermediate between the adhering folds of the pericardium has been found more than an inch in thickness, its texture sometimes laminated like the coagulum of an

aneurismal sac, red or tawny near the heart, and pale or white more remote from it, sometimes of a mixed consistence, in part almost liquid and purulent and in part solid or tuberculous. Or the adventitious substance has been of one uniform texture, either so like muscle as to be at first mistaken for the fleshy substance of the heart itself, or so far firmer than muscle as to resemble flesh hardened in brine, either much paler than the heart, or much redder from being deeply injected with blood. This tough flesh-like substance may occupy a portion only of the surface of the heart or the whole of it. I have seen it opposite the right auricle, while every where else the pericardium has closely adhered with little intervening medium, and I have seen it enveloping the entire organ and forming round it (as it were) another case of muscle. And then, if (what often happens) the muscular substance of the heart itself be augmented, a strange spectacle is disclosed on dissection. There is an enormous mass displacing the lungs and leaving nothing visible in the entire front of the chest but itself.

These results are very striking. But can we interpret them truly? Can we take them and read them (as it were) backwards, and so tell the course and clinical history of the inflammation or inflammations which produced them?'

In all cases, from what we know or from what we learn of the patient's previous life, this one

point is clear beyond a doubt, namely that the vast amount of unsoundness had its start or point of departure from an attack of pericarditis several years ago. And in many cases from what we know or what we learn, thus much more becomes certain or highly probable, namely that the original unsoundness received accessions from distinct subsequent attacks of inflammation. We seem to read thus much in the character of the morbid deposits, when there are layers of lymph upon lymph varying in colour and consistence, or when matter soft and friable intervenes between firm and tough adhesions.

But in other cases, neither from what we know nor from what we learn of the history of the patient's life or the nature of what is found after death, can we get all the sure insight we desire into those morbid processes, which succeeding to the original pericarditis have built up the vast mass of unsoundness eventually disclosed. The original pericarditis, we are told, left behind it præcordial anguish and palpitation, and these never afterwards ceased but became greater and greater to the last. But in the mean time it is uncertain whether there were any fresh attacks of inflammation or not.

In such cases we are left to choose between two reasonable conjectures. Fresh and distinct attacks of inflammation might have arisen and brought their contingent to the original unsoundness and yet all sure notices of them have lain

concealed under the magnitude of the abiding distress. How possible this is, has been already shown when we were considering the diagnosis of secondary pericarditis. Or, without any fresh or distinct attacks, the adventitious texture first formed might still continue to entertain the inflammation which formed it, and so carry within itself the principle of its own increase. This, being ever afterwards slowly but ceaselessly at work, goes on to amass by interstitial deposits a greater and greater cumulative unsoundness. The uniform colour and consistence of the adventitious substance seem to countenance this last conjecture.

LECTURE XXIV.

PERMANENT UNSOUNDNESS OF THE ENDOCARDIUM AND PERICARDIUM FROM DISEASES OF A SPECIFIC AND MALIGNANT NATURE, ESPECIALLY FROM ANALOGOUS FORMATIONS. — THEIR ANATOMICAL CHARACTER. — THEIR CLINICAL HISTORY. — THEIR CLINICAL DIAGNOSIS. — OUR KNOWLEDGE OF THEM COMPARED AND CONTRASTED WITH OUR KNOWLEDGE OF INFLAMMATION.

THUS far we have been considering the permanent unsoundness derived to the heart from *disease*, and that disease inflammation, and that inflammation of the pericardium and the endocardium; in other words the local effects of one or of several attacks of inflammation upon these structures when they are left imperfectly repaired. But permanent unsoundness may be derived to the heart from disease, and that disease be of the endocardium or the pericardium and yet not have the nature of inflammation.

The several textures which compose the heart are not exempt from those diseases which, by whatever name they are called, result in formations different from the natural structures of the body, such as tubercle, carcinoma, cephaloma, &c. But

these diseases have not any special pathology respective to their seat within the heart, or (what is more to our purpose,) any distinctive history, diagnosis or treatment. Therefore it would be going out of our way to enlarge our notice of them. I would only observe of that disease with which experience has made us most familiar, that it seldom affects the heart. I have in a few rare instances seen the pericardium studded with scrofulous tubercles, when they have been coincident with tubercles of the same character in other parts of the body and especially in the lungs. Scrofulous disease seems to have a natural preference for one organ or structure before another. Its tubercular deposits are apt first to take place in a single part and then, if life continue, to involve other parts almost in a certain order. And life not unfrequently does continue long enough to allow them to spread beyond the part first and chiefly and fatally affected, and to reach two or three others. Yet they seldom reach the heart.

But the heart is apt to derive permanent unsoundness from diseases (if they deserve the name) different from all these, and different too from inflammation. They consist of (what are called) deposits of analogous tissues: analogous, that is, to healthy tissues, as partaking of their nature, but now having the character of disease, since they now occupy the situations where in health they are

never found. Thus cartilaginous and osseous matter is found in the pericardium and the endocardium. It is not indeed either perfect cartilage or perfect bone, but it approaches to the one or the other both anatomically and chemically.

Now the strict local pathology of these analogous tissues, the manner of their origin and growth and increase within the heart I must leave you to learn from other instructors. Our proper business is with their *living* history and their diagnosis and their treatment. But some idea of their objective reality should be brought and kept before the mind, if we are to take any just measure of their living events and form any just expectations of the effects of remedies upon them. A few particulars therefore concerning them require to be briefly stated.

The endocardium is much more frequently the seat of these analogous formations than the pericardium. But a specimen of ossified pericardium is to be found in most museums.

In the specimens I have met with, the manner in which the bone has been deposited has been very peculiar: it has constituted one large plate or ring, running round the heart; or even a sort of case, which has nearly enveloped the whole organ. From this ring, or case of bone, processes sometimes are given off, which penetrate the substance of the heart, and reach even to its cavities.

Laënnec met with an instance in which this sort of bony case was formed around the heart, and gave off processes, which penetrated its cavities in the manner described: and he satisfied himself by dissection, that the morbid growth was developed between the fibrous and serous layers of the pericardium, since he was able to separate it, and still leave the heart covered by the serous fold of its investing membrane.

In the endocardium analogous formations are more various and more frequent. Cartilaginous depositions are often found beneath the membrane where it is single; or between its folds where it is double, in the situation of the valves; and thus they seem rather to belong to some structure contiguous to the membrane than to the membrane itself. Such depositions will proceed to a considerable extent, while the membrane still remains free from disease. From a valve, which has been thick, opaque, and cartilaginous, I have seen the membrane separated on both sides, and transparent; the opaque and cartilaginous matter being left behind. Where, in cartilaginous depositions, the lining of the heart has become puckered and uneven on its surface, and the valves shortened and altered in their shape, the membrane itself participates in the disease, and is generally incapable of being separated from the subjacent structure. But great thickening may take place in the situation of the valves, from deposition of

cartilage, without any unevenness of their surface or alteration of their shape; and under these circumstances the membrane itself you may expect to find hitherto exempt from disease.

Osseous depositions are always, I believe, originally formed beneath, or exterior to, the membrane, both in the heart and in the arteries. There are two circumstances especially worthy of remark in this process of ossification: sometimes it is a pure and unmixed process: bone is formed, and nothing else. It is deposited in minute granules, or little brittle scales, or in plates of a larger size; and the intermediate spaces, whether in the heart or arteries, preserve their natural and healthy appearance. At first, these granules or scales, or plates of pure bone, are covered by a delicate pellicle, which is in fact the internal membrane of the heart or artery, separating them from the immediate contact of the circulating blood. But in process of time, as they increase in size, and become rough and unequal on their surface, they cause a rupture of the internal membrane, and have now nothing to separate them from the immediate contact of the blood.

Sometimes ossification is a mixed process, or rather, the result of another morbid process preceding it. With the cartilaginous depositions already described there is an admixture of bone. The quantity of bone generally bears a small proportion to the cartilage when they both occur to-

gether, as if the bone proceeded from the cartilage, and not the cartilage from the bone. It is sometimes seen growing from the surface of the cartilage, and is sometimes deposited in its substance, and only detected by the knife.

Enough has been said of these analogous formations to show that they constitute a real unsoundness of the heart. But *whence* come they, and *why* come they in the living man? Have they any clinical history which can tell us? Assuredly they *have* a clinical history, but it is no such history as that which belongs to an acute endocarditis or pericarditis. They have no sudden fever, no abrupt pain or swelling of external parts, in the midst of which they declare themselves for the first time, and which fix the exact date of their origin and give intelligible intimations of their very nature. Yet still they have a clinical history, but it is such as belongs to all *chronic* disease.

When disease is essentially acute, the preceding circumstances conducive to it are (so to speak) acute also. They are often as marked and as palpable as the disease itself, and we seldom need to look far back before we find them. The pneumonia of to-day comes from exposure to cold which was bitterly felt yesterday. The fever of to-day comes from exposure to some known contagion or some malarious influence in the course of the last week. The endocarditis and pericar-

ditis of to-day are only what we have been expecting and fearing since our patient has been ill of acute rheumatism.

But when disease is essentially chronic, the preceding circumstances conducive to it are (so to speak) chronic also. They are often covert and far-fetched and hard to unravel, and we must often look back to a man's whole life, or to the life of his progenitors, before we find them.

Thus in a multitude of cases (for when the question is of chronic disease a single case proves nothing) where the lining membrane of the heart and arteries has been beset with cartilaginous or atheromatous or earthy deposits, the patients have been habitual spirit drinkers for years, and the most conspicuous conditions antecedently presented by them have been the failure of many functions and the growth of structural disease in many organs, especially in those subservient to nutrition.

Again in a multitude of cases the patients have not been grossly intemperate but habitually luxurious, and the ailments chiefly suffered by them beforehand have been gout and its concomitants.

Again in a multitude of cases the patients have always lived in the way most likely to ensure health, and health they have always enjoyed until old age has arrived; and then have appeared the authentic signs of valvular disease of the heart.

But, when all these circumstances have been noted and allowed, they only make one feel more strongly the need we have of knowing something more. The history of diseases, as distinct from their diagnosis, is valuable in proportion as it shows what are their natural preparatives, and what are truly their exciting and predisposing causes.

Intemperate habits, and gout and the gouty constitution and its appurtenances, and old age, all deserve our notice as belonging to the history of the heart's unsoundness produced by chronic valvular disease. But intemperate habits, and gout, and old age must include within them something more general, something common to them all, something working more expressly to its end, and determining the formation of cartilaginous and osseous growths within the heart and arteries by a more direct pathological necessity. But what it is we know not.

We talk sometimes of diseases which come of themselves, meaning that they come without any sure forewarning that they *are* coming. And yet it is probable that such diseases, which are mostly chronic, are more strictly annexed to preceding conditions, although it cannot be shown what those conditions are, than are acute diseases. A man may have acute rheumatism and yet escape inflammation of the endocardium or the pericardium. He may be exposed to malaria or

to contagion, and have no fever. He may encounter a blow or a fall, and suffer no hurt. Here the conditions which precede are plain enough, and so are the diseases which follow, when they really *do* follow. But the fact that they do not always follow takes them out of the category of inevitable consequences. And further, when they do follow, whether they be fevers or inflammations, they are cured, if they be curable, irrespective of the conditions out of which they arose. Being once produced they are set free from subjection to the causes which produced them, and thenceforth yield obedience to influences either inherent in themselves, or brought to bear upon them from without. Hence they sometimes cease spontaneously, and sometimes on the application of remedies; such remedies as operate plainly in counteraction of present morbid conditions, as, for instance, anodynes for present pain, salines for present fever, bleeding for present hardness of the pulse. But with chronic diseases it is often far otherwise. While all that has preceded them has been so little remarkable as to lead us to believe that they came of themselves, yet when once they have declared their existence, then every thing has seemed to show that they had their origin and still have their continuance from a root much deeper than themselves. And, if such diseases be curable, they are not cured by remedies counteractive of present morbid con-

ditions, either by anodynes for present pain or by salines for present fever, or by bleeding for present hardness of the pulse. There may be pain enough or fever enough or hardness of pulse enough, and these may require their appropriate remedies, anodynes and salines and bleedings, and they may yield to them. But while they yield, the diseases remain, because they are indissolubly annexed not to those conditions which we see, but to other conditions which do not appear.

Well! then by what remedies *are* essentially chronic diseases cured, when they are indeed curable? By remedies whose effects from day to day and from week to week are inappreciable, and are seen only after the lapse of years. And what are those effects which are thus tardily and gradually brought to pass? Indeed they can only be expressed in very general terms; terms sufficiently denoting their reality and the imperfection of our knowledge concerning them. Those effects are the change of constitutional weakness into strength; the change of the solids and fluids of the body from pravity to healthfulness, and in the meantime the disappearance of the disease.

It appears then that these analogous formations in the lining membrane of the heart, which occasion its permanent unsoundness, have no such clinical history as can furnish us with any certain knowledge whence or why they come, or with any

sure indications of treatment by which they can be prevented or cured.

But being once formed, have they not a clinical diagnosis? Indeed they have; a diagnosis, which, in one point of view, reveals more than could have been conceived possible of any internal disease, but which in another reveals nothing at all. By present living symptoms we can ascertain their *seat* satisfactorily enough, but we cannot pierce through it into *their nature*. And herein they share the common condition of almost all internal chronic diseases, in which the easy and often sure diagnosis of *their seat* is strikingly contrasted with the dark and conjectural diagnosis of *their nature*.

Now this condition, if it be indeed as general as I represent it, is surely worth enquiring about. Besides it is a condition which bars the rational treatment of all the diseases that it embraces. And if this large class of diseases of the heart, which has long been familiar to our knowledge *anatomically*, still remain far beyond our reach *remedially*, we are fortunate, for our own credit's sake, in being able to show that the obstacles in the way of our art are really insurmountable.

Of the signs by which physicians become acquainted with diseases in the living body, some are expressive of their nature, and some are expressive only of the parts they occupy. The first flow directly from their essence, and may be called

essential symptoms : the second are derived from the disturbed functions and sensations of particular organs, and may be called accidental. This distinction between essential and accidental symptoms is one of great practical importance.

Some diseases have both orders of symptoms most strongly marked. An acute inflammation has its essential symptoms, which are commonly the same, in whatever part of the body it is found, such as general heat and general excitement of the vascular system. And these teach us that it really is an acute inflammation, and how to treat it. Moreover, it has its accidental symptoms, which are different according to the part it occupies, whether the heart, the lungs, or the brain, such as palpitation in one case, impeded respiration in another, and disturbance of the senses and the intellect in a third. But these alone teach us nothing concerning the inflammation, and give us no guidance or direction in the treatment of it.

Again, some diseases have no essential symptoms whatever but those only which are accidental, and which appertain entirely to the organs they occupy. A fungous excrescence, or a scrofulous tubercle, being situated in the brain, may be accompanied by a pain in the head, an hebetude of the senses and intellect, and an impaired exercise of the voluntary muscles ; but the same symptoms have arisen from tumours of other kinds, and even from the lodgement of a foreign body, such as a musket ball, in the same situation. They have

nothing to do with the essence of the tumour in question, and profit us nothing in suggesting any method of cure. They have, in fact, no rational treatment; and simply for this reason, because they have no essential symptoms.

The symptoms which flow from the essence of the disease are present with its very beginning, and accompany the whole process of its formation; whereas the symptoms which are accidental to it do not always appear until it is already formed, and often not until it has endured for a considerable period, and reached a considerable magnitude. Further, it may be stated generally, that essential symptoms belong more especially to acute diseases, and that diseases, in proportion as they are more chronic and of (what is called) a specific character, are apt to lie concealed under symptoms which are derived less from their own nature than from the parts they occupy.

With respect, then, to diseases of the heart, as far as they are declared by essential symptoms, we have an early intimation of their existence, a knowledge of their real nature, and a guidance in the administration of remedies for their cure; but as far as they are suggested by accidental symptoms only, our knowledge is not of their nature but of their effects, and our treatment is not directed to their cure, but to the palliation of inconveniences which are consequent upon them.

Between endocarditis and pericarditis, and the

cartilaginous, atheromatous, and osseous transformations of its lining membrane there is this wide distinction, that the former are of an acute, the latter of a chronic character; and this real difference in their nature determines the difference in the degree of knowledge we have concerning them. As morbid anatomists, we can see and describe the visible characters of both with equal precision; but as physicians, seeking to mark the period of their origin, and to measure the rate of their progress, as the indispensable conditions of adapting a remedy to their cure,—as physicians, we know much that is certain and useful concerning one class of diseases and very little concerning the other.

Endocarditis and pericarditis, by virtue of symptoms which are essential, and derived from their own nature, of symptoms which are present with their beginning, and accompany the act of their formation, submit themselves to medical treatment with tolerable success. They often bring the knowledge of their existence within the period which includes the possibility of their cure.

But these analogous formations of the lining membrane having not essential but only accidental symptoms, merely discover *where they are*, not *what they are*, or how they are to be treated. The time of their accession, and the early stages of their progress, are alike unknown; and the notice of their existence is only at length supplied

when new changes of structure have arisen in the heart itself, and new disorders in the constitution at large, and both the original and all the consequent maladies are absolutely incurable.

Disorganisations of the heart, how complex soever and extensive they may be, have often their origin in the unsoundness which remains after endocardial or pericardial inflammation, or in that which results from these analogous formations. If in the former, their history is capable of being traced from their commencement, and pursued throughout their course regularly and connectedly ; if in the latter, their history must be taken up at a period remote from their origin, and will always be most doubtfully and imperfectly made out.

LECTURE XXV.

DISEASES OF THE HEART'S MUSCULAR STRUCTURE.—
ACUTE INFLAMMATION TERMINATING IN THE FORMATION OF PUS.—CASES.—EXPLANATION OF THE NATURAL DIFFICULTIES IN THE WAY OF ITS DIAGNOSIS.

I MAY seem perhaps to have passed by all consideration of the muscular structure of the heart, as if it were altogether incapable of disease. But I have only postponed it, thinking that its diseases might be advantageously regarded in contrast or comparison with those of other structures which have already been the objects of our inquiry. For indeed the muscular structure of the heart *has* its diseases; yet many of them are during life brought within our knowledge only in very small measures and degrees, and some of them not at all.

But it is a great thing, let me tell you, to understand the imperfections of our knowledge, and so to analyse its defects, as to be made aware what parts of a subject still remain (as it were) in the shade, and need to be brought into clearer

view by the light which future observation may bestow upon them. Therefore, in reckoning what information we have concerning diseases of the muscular structure of the heart, I shall be careful to point out what we have not. By its diseases, I mean processes essentially morbid, which bring change and detriment to its elementary texture, not mere alterations of size and shape and capacity, leaving the elementary texture otherwise unchanged and uninjured; a distinction most needful here to be borne in mind.

The muscular structure of the heart is capable of acute, pervasive, pus-depositing inflammation. But this inflammation has no customary assemblage of preceding or concomitant circumstances, *i. e.* no clinical history to tell us when to expect it, no sure diagnosis to tell us when it is present, and consequently no definite indications of treatment either for prevention or cure.

A boy, twelve years of age, was in perfect health on Saturday night and dead on the following Tuesday afternoon at two o'clock. He had in the opinion of all who saw him the severest inflammation of the brain. The attack was sudden with great heat and frequency of pulse. He had delirium and convulsions and pointed to his forehead as the seat of his pain. At length he sank into a state of insensibility and died. Upon dissection not a vestige of disease was found within the cranium, but the heart was the seat of

the most intense inflammation pervading both the pericardium and the muscular substance. Four or five ounces of turbid serum with flakes of coagulable lymph floating in it were found in the cavity of the pericardium, which had its internal surface covered in various situations with a thin layer of reticulated lymph. Thus far there were the evidences of acute inflammation of the pericardium at an early stage. There was no adhesion of the opposite surfaces; the lymph and the serum had been effused together, and the serum had partially washed away the lymph as it was deposited. Further, when the heart itself was divided, the muscular fibres were dark-coloured almost to blackness, loaded with blood, soft and loose of texture, easily separated and easily torn by the fingers; and at the cut edges of both ventricles small quantities of dark-coloured pus were seen among the muscular fibres. The internal lining was of a deep red colour without any effusion of lymph.

Here the acute inflammation of the muscular structure was evinced in a manner which had never been seen before. The softening and friability of its texture would perhaps have been enough to bespeak it inflamed, but here was an actual deposition of pus.* This was a singular

* This case was reported by Mr. Stanley thirty years ago. I was witness of it at the time, and present at the

specimen of disease. It happened thirty years ago. But I have never seen another like it; and I only know of one other like it, which occurred twenty years afterwards to Mr. Salter of Poole. I will endeavour to abridge the case, taking as much care as I can to preserve its points of interest and instruction.

A man 50 years of age by trade a glover, but formerly a dragoon, applied to Mr. Salter for advice and gave this account of himself. Six weeks previously, while walking, he was seized with pain at the lower part of the chest inclining towards the left side. It was of short duration but of extreme severity producing faintness and cold perspiration. A week afterwards, returning from a walk of three miles, he was seized with the same sort of pain with the like fearful accompaniments. And now the attacks became more frequent but varied in their degree of severity and in the occasions producing them. They sometimes arose independent of exertion or seemed to arise from the mere act of raising the arm. At length a considerable uneasiness of the left arm often attended the pain in the chest. Auscultation could find nothing wrong either in the heart or in the lungs. The symptoms obtained some degree of relief from certain remedies addressed to the

examination after death. — *Med. Chir. Trans.* vol. vii. p. 323.

stomach and bowels, which their present disordered state seemed to call for.

Six days after Mr. Salter first saw him, and seven weeks after his first attack, he was seized with his longest and severest, his last and fatal paroxysm. It continued sixty-five hours and never ceased until it killed him. Its accession was with the consciousness of coming death. His face became all at once pale and his features sharp and his expression anxious and his breathing oppressed. He could not lie down. He placed his hand over his sternum and said "it all lies here." The pain was now a dull heavy pain. Still the heart's action was natural, air passed freely through both lungs and the pulse beat regularly 80 in a minute. He was bled to 10 ounces and blistered. This was early in the morning.

In the evening his sufferings and anguish were the same in kind but vastly augmented. They were too great for him to express what he felt; too great to allow any satisfactory examination to be made of his chest. The pulse had lost in power and gained in frequency. It had reached 120. He was now ordered four grains of calomel and one grain of opium every four hours. The night was past in indescribable distress. The next morning he was still alive; yet the beats of his pulse were scarcely to be felt or the sounds of his heart to be heard. The surface was losing its heat and positive pain was less. He continued

however to live through that day and through the following night and through the next day until eleven at night, with all his extremities cold and his pulse imperceptible, and then died, his mind remaining clear to the last.

Now in this case it was pretty evident that the heart was the seat of disease. But no experience which I possess could have enabled me to say, during the life-time of the patient, what that disease was. These were the appearances upon dissection. In the pericardium both where it was loose and where it covered the heart, especially opposite the left ventricle, there was excessive vascularity; and where it was attached to the diaphragm the excessive vascularity was mixed with ecchymosed spots and blotches. But there was neither serum nor lymph nor pus effused from any part of the membrane. Within all the cavities of the heart coagula were largely accumulated. But there was no vestige of disease at any part of the internal lining. The great centre of disease was the muscular substance of the left ventricle.

“Excepting a small portion of a few lines in thickness on either surface, the left ventricle had entirely lost its muscular colour; it was of a lightish yellow hue but still preserving the fibrous character of muscle. From all the cut surfaces of the various sections, which were made, could be scraped purulent matter. In some parts absorp-

tion had taken place leaving small cavities in the muscular substance, varying from the size of a pin's head to that of a small pea. These were all filled with pus."

What was further found, viz. half a pint of serum in the right pleural cavity and the complete engorgement of the left lung with sero-sanguineous fluid, might be looked upon as the result of the last day's agony.

Upon a review of the whole case Mr. Salter comes to the following conclusion. It appears sound and just and embraces (I believe) the real truth of the matter. It is this; "that a chronic inflammation of the muscular substance of the left ventricle of the heart constituted the primary disease and that it no doubt existed at the time the first symptoms occurred: [this supposition, if correct, explains the effect of bodily exertion, even of the most trifling kind, occasioning so much distress:] and that the accession of the violent symptoms may have arisen from the inflammation then assuming an acute form and extending to the pericardium."*

What a lesson do these two cases contain! Watched by competent observers from first to last and from hour to hour with curious and earnest

* Med. Chir. Trans. vol. xxii. p. 72. Mr. Salter's valuable paper should be carefully studied. I hope it has not suffered injury at my hands in the attempt to condense it.

interest they baffled all reasonable calculation of what was going on during the life of the patients. And yet after death dissection disclosed the commonest and the best understood (so we think) of all diseases, inflammation; inflammation, which had begun and proceeded in its most ordinary manner, and which had ended in its most ordinary event, suppuration. But it was inflammation of the *muscular substance of the heart*.

So it was not the nature of the disease that lay at the root of the mystery, but the part it occupied. For be the nature of a disease ever so well known, prior to experience who can tell how any living organ will be affected by it? But there was not *then*, and (as far as I know) there is not *now*, beyond what these two cases have taught, any experience in the world, how the living heart is affected by acute suppurative inflammation of its muscular substance.

And what now have these two cases really taught us? Have they left (what may serve for) a traditional experience to future observers enabling them to discern and to treat acute inflammation of the heart's muscular substance in the living man? Surely they have not. They have taught the possibility of such a disease in such a part, and nothing more.

Yet do these same cases contain a lesson of a more general and comprehensive kind. And we should do well to consider it. In showing us our

defective knowledge of the disease in question, they allow us to catch a glimpse of a great pathological secret. They give us some intelligible notion why the most acute diseases often are, and needs must be, imperfectly developed in their living signs.

The general vascular system and the general nervous system serve each as a glass in which we are fain to read the reflection of diseases, when we have no direct vision of the diseases themselves. Here, as in higher philosophies, we take measure of things by their shadows.

Diseases which are local in their seat and origin are said to have their constitutional symptoms. By this nothing more is meant than that they affect the general vascular system or the general nervous system in certain ways. Affecting the vascular system they produce the phenomena of fever, cold and heat and perspiration, either of them alone or mixed, or interchangeably with one another, also strange movements and impulses of the heart and arteries, and strange acceleratings and retardings of the blood itself. Affecting the nervous system they produce new and strange sensations of infinite kinds and degrees, pain and anguish, excitement and depression, and, when they reach the nervous centres, as they often do, delirium and convulsions.

From these several modes of action and suffering in the vascular system and in the nervous

system we gather that portion of our knowledge of diseases which is most eminently practical. For, however sure an insight we may have into the essential processes which constitute diseases within any part, we cannot stir a step safely or profitably in their treatment, until we learn how the vascular system or how the nervous system is affected by them, provided they be of a nature to affect these systems at all. Where are the signs to be sought of acute inflammation when it occupies an organ out of sight? Where the signs by which we are to make sure of its existence, to measure its force and the rate of its progress, and to apply the remedy? Mainly in the general vascular system and subordinately in the nervous.

Well! but do all diseases of the same nature, which are capable of affecting the constitution, display themselves in their constitutional symptoms at all times after the same manner and to the same perfection? Does inflammation do so? I think not. And herein lies one secret at least of the defectiveness of our knowledge.

Call them sympathies or what you will, by which all the bloodvessels and all the nerves of the body share the actions and sufferings of a part diseased, they must have invariable relations and a constant order, if the phenomena which they display are to be constantly relied upon. But the mere magnitude of the disease, or the part it occupies, or the temperament of the

patient is ever interfering a little with these constitutional sympathies, and is ever disturbing a little their natural relations and order; not more however than we can easily make allowance for. And if this were all it would be well. But sometimes the mere magnitude of the disease and sometimes the nature of the part and sometimes the temperament of the patient, one or all, so utterly confound them and their relations and their order, that either they cannot tell us what they ought to tell us, or they tell us what is absolutely false.

Most frequently it is from the nervous system that the whole perplexity takes its origin. The nervous system will run on to such an excess of sympathy as to seem to engross all living action and suffering and allow nothing to appear in the body but what directly proceeds from itself. It will tyrannize (as it were) over the vascular system and keep it under, and forbid it to display by its appropriate sympathies those diseases which cannot otherwise be displayed at all. I am well aware that this is not pathological language. It does not explain the processes of things, but it may serve to characterise their results.

In the first of those two remarkable cases which have been related, the sympathy of the nervous system was a mixture of action and suffering but chiefly action, and so intense, so plenary and alone as to draw off all show and

perception of the disease from the part affected, and to appropriate them to itself. The physician could see no sign of disease in the heart and the patient had no feeling of it there. In show and in perception it was fixed in the nervous centres. The physician saw it and the patient felt it in the brain and in the spinal marrow and nowhere else. All was delirium and convulsion and nothing besides.

In the second case the sympathy of the nervous system was in the way not of action but of suffering. There was no convulsion, no delirium. The intellect was clear throughout and to the last. This suffering was in the part and not out of it, but so intense and so all-subduing as to suppress and keep down all the proper symptoms of the existing disease. For six weeks the malady consisted in short paroxysms of extreme pain and anguish belonging to the heart. And when the malady was consummated at length in one long paroxysm of three days, it too was all pain and anguish, still centred in the heart and still effectually hiding the inflammation, which had been progressive for weeks and had now reached its accomplishment in suppuration.

LECTURE XXVI.

DISEASES OF THE HEART'S MUSCULAR STRUCTURE CONTINUED. — CHRONIC INFLAMMATION TERMINATING IN ULCERATION — IN PARTIAL DILATATION — IN POSSIBLE RUPTURE. — ITS DIAGNOSIS UNATTAINED. — CASES. — THE SOFT HEART. — THE FAT HEART. — INQUIRY INTO THEIR CLINICAL DIAGNOSIS AND CLINICAL HISTORY. — RUPTURE OF THE FAT HEART. — CASES.

MORBID anatomy has disclosed to us other conditions of the heart's muscular structure with which we are familiar as results of inflammation in whatever part of the body they are found; such as circumscribed abscesses or deposits of pus; also ulcerations, some having their origin and progress from the pericardial surface inwards and some from the endocardial surface outwards.

In the heart it has been sought to demonstrate by dissection the same forms of aneurism which affect the arteries. And to a great extent successfully. Now there is none of them which do not involve disease of its muscular structure, disease originating within itself or imparted to it from contiguous tissues. Sometimes the aneurism has presented an appearance as if the disease from which it resulted had belonged to the muscular structure entirely and exclusively. The

endocardium and the pericardium have come together at the dilated part, and no muscular structure has been found intervening between them. It has been destroyed by disease, and is absolutely absorbed and gone. Sometimes it has seemed as if it had begun from inflammation at a spot of the endocardium, which had softened and destroyed the subjacent muscular layers and so, proceeding by intermixtures of pus and blood, had ended in rupture. This is an acute form of aneurism. Sometimes it has seemed as if it had begun by converting the muscular substance into a semilardaceous, semifibrous mass, and proceeded by gradually attenuating it and implicating the endocardium and pericardium with it; and so, by the impulse of the circulating blood, a pouch-like dilatation has arisen and perhaps ultimate rupture. This is a chronic form of aneurism.

But the subject of cardiac aneurisms, and of all the forms of disease which it embraces, is one of great pathological interest, and must be studied in the writings of those who have handled it with the care which it deserves.* It was necessary for

* M. Thurnam has pursued his researches into this subject with singular industry and ability. He has brought together from all quarters a multitude of interesting facts, and displayed them and commented upon them in the best manner. — *Med. Chir. Trans.* vol. xxi. p. 187.

See an admirable summary of the same subject by Hasse

me thus shortly to direct your attention to some of its prominent realities, before I could well proceed to consider the living phenomena connected with them.

Now our clinical acquaintance with these diseases during life has not kept pace with the knowledge which anatomical investigation has procured us of them after death. Sometimes they have had their beginning and their progress without awakening in the patient the least suspicion of any thing wrong within the heart. He has had no consciousness of ailment or suffering, and the fatal consummation has been an awful surprise. Sometimes they have been attended with suffering enough to alarm the patient and by symptoms enough to enable the physician to infer damage of the heart, and even to anticipate its fatal event, but not to be sure of its nature ; such as faltering and failure of the circulation and dyspnoea and anguish, either constant with occasional aggravations, or altogether occasional and in paroxysms, but, whether constant or occasional, never attended with any precise auscultatory signs.

But sometimes they have had the accompaniment withal of precise auscultatory signs, and these have gone to the clear diagnosis of certain present conditions of disorganisation within the

in Dr. Swaine's translation of his *Pathological Anatomy*, lately published by the Sydenham Society, p. 140.

heart. But then these conditions have been no essential part of *the* disease. Auscultation has told of hypertrophy and general dilatation of the ventricle with certainty enough, but it has left the partial aneurismal dilatation and the circumscribed progressive ulceration and the impending rupture entirely unsuspected.

J. R. was not far short of seventy. For the two or three last years of his life I knew him well and saw him often, but never heard him complain of any infirmity. He was an accomplished scholar; convivial and more than habitually cheerful; he was even habitually joyous. This I mention to show the great probability that he really felt nothing of his fatally progressive disease. With such a constant complexion of mind surely he could not have been a constant sufferer.

On Saturday, the 7th May, 1831, he became alarmingly ill and I was called to visit him. I found him seated in his chair, his countenance blanched and full of anguish, his breathing hurried, his skin chilly, and his pulse very frequent and very feeble. He spoke in catches, now running on rapidly and now coming to a stop, as people do when they have not breath enough to carry them through what they have to say. He muttered something about sinking and fainting.

All this looked near akin to death. And my present business was to keep him from actually dying by any stimulus I could administer.

I collected this history of what he had been lately doing. It was the time of a general election; that general election which was to settle the fate of the Reform Bill, when all England was in an uproar. My friend had posted down to Northumberland, and then posted back to Cornwall, had been elected for a Cornish borough and then returned to London. He had only been in town a day or two. On the preceding day he had suffered severe diarrhoea and vomiting, and on that very morning the vomiting had returned.

With this history I conceived simple exhaustion was almost enough to account for what I saw. I had him put into a warm bed, and desired that warm gruel mixed with brandy should be given him pretty frequently, until I saw him again.

In an hour or two he was relieved in his general feelings. He had thrown off his death-like aspect. But still his respiration was fearfully hurried and his pulse very frequent and very feeble. And now in running my ear over his chest I heard a small crepitation at various parts of the lungs. It was upon the whole of great extent, and proceeding (as it seemed to do) from the lesser bronchial ramifications I looked upon it as the cause of the present dyspnœa. Accordingly I took it as my indication of present treatment and ventured to apply a few leeches. They drew but little blood and that very tardily, owing

probably to the chilliness of the surface and the emptiness of the cutaneous vessels. Nevertheless he was relieved; and during the night a poultice was spread all over the front of his chest which obtained a little more blood from the leech-bites, and more relief. With this local treatment I was still upholding him with cordials and ammonia.

The next day, Sunday, I saw him several times. There was less about him to occasion alarm, but enough of hurry and impediment in his breathing to call for a large blister. This was applied to the chest and allowed to remain on twenty-four hours. It raised very little vesication but acted well as a rubiacient, and further relief followed.

On Monday this relief was apparent, and when my ear was now applied to the chest, it found the respiratory murmur passing through every part of both lungs unmixed with any unnatural sound except below the scapulæ. Here the crepitation remained. His skin was now constantly bedewed with a warm gentle perspiration. Every thing about him was promising except his pulse, which was still very frequent (much above 100) and extraordinarily feeble.

On Wednesday, having allowed him to leave his bed, I found him up and dressed and seated in his chair, reading Horace, and as joyous as ever, and intent upon going to the Eton dinner the next week. At this time he believed himself almost well, and indeed he looked so. Even his

respiration no longer suffered impediment from the exertion of walking about the room. Still the feebleness of his pulse was extreme and its frequency was not at all reduced.

The two next days, Thursday and Friday, brought him in his own consciousness and to all appearance nearer and nearer to health. But his pulse was as weak and as frequent as ever. It had also something strange in its character which I cannot describe. In my examinations of the chest from time to time I had found the heart's impulse exceedingly feeble, yet perceptible in a larger space than natural; and it was feeble still. All this did (I confess) occasion me some apprehension, and I begged upon the plea of the peculiarity of his case, that he would allow me the benefit of consulting with some other physician, before I granted him the rights and privileges of health. Accordingly it was agreed that Dr. Maton should see him with me on Sunday or Monday.

On the morning of the next day, Saturday, I found him in bed and was told that he had passed the night uncomfortably. He had himself however been quite unconscious of it at the time, but he was now sensible enough of a more hurried respiration. Yet to my ear the air passed freely and without unnatural sound through the entire lungs except the lower part of the right behind. Here there was crepitation, and here I put on a

blister. I saw him again at 8 o'clock at night, when he was much more at ease in his chest. Three hours afterwards I was summoned to him on an alarm of his being worse. I went and found him dead.

The account given me was this. His attendants had been absent from his room a few minutes. On their return they found him with his body stretched towards a table by his bedside, lying motionless, and holding a cup of barley-water in his hand. They thought he had fainted and endeavoured to rally him, but without success. He was probably then dead, although, when I arrived an hour afterwards, they did not seem sure that he was so.

The body was examined after death. The cavity of each pleura contained about a pint and a half of clear serum, without a vestige of inflammation on the surface of the membrane. The lungs were pervious to air and crepitous at every part. Wherever they were divided, there followed a small quantity of frothy serum a little tinged with blood. At its posterior and lower part the right lung was somewhat denser, and of a darker colour than elsewhere. But here too it was quite crepitous, only, where it was divided, a larger quantity of serum and more mucus mixed with blood followed than from other parts.

There was no unusual amount of fluid in the bag of the pericardium; but the membrane was

unusually vascular. The heart was large, and at one part of its walls (a space of about two inches) constituting the left ventricle, it was pale and very soft and gave to the touch the notion of an abscess approaching the surface from within.

All its cavities were perhaps slightly increased in their capacity, but its lining membrane presented no visible trace of disease, save where and what will be mentioned presently. Its whole muscular structure was flabby, pale, and lacerable, a condition which seemed to arise from its partial conversion into fat. The fat in some parts occupied the place of the muscular fibres, the external layers especially; in other parts it was intermixed with them, now one and now the other being predominant.

That portion of the left ventricle already mentioned, which in its external aspect gave suspicion of an abscess, presented the following conditions of disease. There the heart was so attenuated as not to exceed the breadth of a half-crown piece, and rupture or ulceration preparatory to rupture was in progress. The internal lining was destroyed, and to the rough surface that it left a large irregular shaped clot of blood was adherent. What remained exterior to the clot had lost all cognizable organisation; it hardly cohered together and was torn like wet paper.

The aorta throughout its course within the chest (for so far only it was examined) was dotted

with little earthy and atheromatous deposits. The omentum was loaded with fat. The liver was twice the natural size and full of blood, apparently not diseased. Its red structure predominated.

This was a case of aneurismal or partial dilatation of the left ventricle, in which rupture was only just anticipated by death. The beginning and progress of the disease were undistinguished by any living phenomena. When it reached its consummation, then indeed symptoms arose, which were striking and prominent enough. But they had no diagnostic character. As to the nature of what was going on they told us absolutely nothing.

Let me give another case : —

H. T. was sixty-three years of age. He had passed a very laborious life, carrying on an extensive business as a general medical practitioner ; yet he had had no experience of disease in his own person and had been singularly exempt from bodily infirmity until the autumn of 1844. It was then that he was suddenly seized with cholera. I attended him, and for forty-eight hours thought him in great peril. Vomiting and diarrhœa, an enormous evacuation of fluid like water-gruel upwards and downwards, and severe abdominal pain and coldness and duskiness of the surface, and cramps of the lower extremities and a very feeble and frequent pulse sufficiently denoted the nature of the disease and its extreme danger. I

treated him with calomel and opium to restore healthy secretion and subdue pain on the one hand, and with brandy-gruel to keep him alive on the other. In two days bile was again apparent in the evacuations and he was safe for the present.

Yet he did not pass at once into health, but lapsed into a state of fever. It was fever of low action and continued with increasing debility for more than a week ; when it showed enough of an intermittent character to suggest the use of quinine. The remedy was true to its specific virtue. His rigor, heat, and perspiration never returned, and he was at once fairly on the way to health again. But he never actually regained the same perfection of health which he had enjoyed before. His family told me he was never again the same man. Yet to me his aspect bore no marks of change. If it had, I must have observed it. For I saw him at intervals ever afterwards as long as he lived, being in attendance upon a near relative who resided with him and was dying of a lingering disease. To his family however he complained that he was more easily fatigued than he was wont, and he spoke sometimes of uneasiness in the chest and palpitation. Yet he made no complaint to me. He was still bustling about in a carriage or on foot day and night.

I mention these circumstances because they are not irrelevant to the event. I saw him for the last time on Friday Feb. 6. 1846. He was

then (as I believed) in health. On Saturday Feb. 7. at half-past 11 P. M. he was seized with illness and on Monday Feb. 9. at half-past 1 P. M. he died. I happened to be out of town at the time. All was done that could be done by Dr. Roots, who saw him during these last thirty-eight hours of his suffering and of his life. At the house of a patient, whom he went to visit late at night, he was attacked with vomiting and diarrhœa, and passed at once into a state so full of alarm that Dr. Roots was summoned to him. That physician has described to me that he found him apparently dying. He was removed to his own home. And still for the rest of that night and the whole of the next day and the next night he was apparently dying. He did not rally in the least degree. All the stimulants which were administered just kept the circulation moving and nothing more, until on the following day he breathed his last at half-past 1 P. M.

In this as in the former case the fatal attack began with vomiting and diarrhœa. The coincidence is worth notice.

The body was examined after death by Mr. Wormald who has furnished me with the following description of what was found.

“On opening the chest, which was very capacious, the pericardium appeared full and tight. Although no great quantity of liquor pericardii was effused, yet, the heart being large and all its

cavities gorged with blood, the membrane was greatly distended. White patches on the surface of the heart gave evidence of past inflammation, and its substance was of a brown tint and of a more flabby consistence than the other muscles of the body. The lining membrane was thickened especially about the base of the mitral valve, where there was a deposit of a yellow colour. The left ventricle was very capacious and its walls thicker than natural except at one circumscribed space. This was between the two large *carneæ columnæ*. Here, at the expense of the muscular substance which had entirely disappeared, a cavity was formed large enough to contain half a walnut. The thickened lining membrane was here united by lymph to the serous covering of the heart, and both together formed its external boundary. It was diaphanous, and served for the only barrier which prevented the blood flowing from the ventricle into the cavity of the pericardium. There was no laminated coagulum in the aneurismal pouch."

Mr. Wormald adds, "The liver was large and indurated, and the terminal branches of the *vena cava hepatica* were loaded with blood. There was moreover a slight rupture of the peritoneum covering the liver, which extended to one of the small hepatic ducts and to one of the branches of the *vena portæ* between the lobules. This served

to account for some blood mixed with bile, which was found in the cavity of the abdomen.”

Here as in the former case rupture was only just anticipated by death. And in both cases death probably arose from the physical impossibility of the heart's maintaining its power of contraction after it had suffered absolute loss and disconnection of its muscular substance, while its place was nevertheless supplied by other tissue.

This partial dilatation or proper aneurism of the heart, in which its muscular structure is especially implicated, is a form of disease by no means unfrequent, very interesting pathologically and always tending to a fatal event. My business has been to learn how far we have cognizance of it by living circumstances; whether it has any proper clinical history or clinical diagnosis. And not any such can I find.

But existence may continue until actual rupture take place and blood escape into the cavity of the pericardium. Death is then more instantaneous. I have seen some such cases, but I have not known them until their fatal event has already arrived. It is hardly necessary to record them for the sake of telling how this that and the other person fell down dead without any previous warning. It is not the manner of *death* that it is profitable to understand in this disease but the manner of *life*; how life and the great organ of life are affected by it at its beginning and during

its progress, and what indications they show enabling us to minister to it remedially.

The two cases, which I have related, surely do not contain what we are in search of in respect of the particular disease. But they contain, nevertheless, matter for reflection. They convey, not a clear understanding, but some conceivable notion, how life itself and the very attributes and conditions of life in different organs may interfere to prevent that perfect knowledge of diseases, which we seek from their symptoms.

Take these two cases and compare them with the other two which were given in the course of the last lecture, and see what they appear severally to denote. The first are cases of acute inflammation in the heart's muscular structure running on at once to the formation of pus. They show a disease of such force and rapidity as by its overwhelming impression upon the vascular system and the nervous system to throw all sympathy into disorder, and utterly to confound the signs by which we could judge of its existence. The second are cases of chronic inflammation of the same structure proceeding by little and little with its destructive process of ulceration. They show a disease so tardy and so gradual as to convey no perception of what it is to the blood-vessels or to the nerves, and to awaken no sympathy in them, and call forth no signs from them of its existence. Its whole clinical history is comprised in its fatal event.

The rupture of the heart, which has just been spoken of as the last result of ulceration, may yet occur independent of it. Still wherever it has been found, there has generally been at the same time some peculiar condition of the muscular substance which might be presumed to favour it. It has been so soft and loose of texture that it could be pierced through with the weight of a probe. Or it has been converted into, or greatly intermixed with, fat.

Not that a rupture has not been found where the texture of the parts has seemed to offer no natural facilities to its occurrence, as in the case related by Harvey himself, who found a lacerated aperture in the left ventricle capable of admitting the finger through which blood had escaped into the pericardium, the walls of the ventricle being increased in thickness and strength, while an obstacle existed at the entrance of the aorta.* Here the heart must have torn itself asunder by the simple violence of its contraction in contending against the impediment to the egress of blood from its cavity. This is an effect which would hardly be thought capable of being thus produced. But I can well conceive it possible, having seen one of the recti muscles of the abdomen torn in twain in a man, who died of tetanus.

The two conditions of the heart's muscular

* Harvei. Exercit altera.

tissue which have been just mentioned incidentally, deserve a more special notice. We have seen that rupture is sometimes found to take place for no other apparent reason than because the heart is soft or the heart is fat. This is a grave result and enough of itself to bespeak attention to whatever may conduce to it. But softening of the heart and its conversion into fat have other serious results to which they lead.

What is meant by softening is this, a loss of the natural firmness of the heart's muscular fibres and of their natural cohesion among themselves, whereby the organ becomes flaccid and yielding under slight pressure and is easily torn. Being separated from the body it is unable to maintain its natural shape. Instead of being round it collapses and becomes flattened. In its extreme degree of softening it presents a loose, soddened, homogeneous mass, which has lost all trace of fibrous structure.

For the clinical diagnosis of the softened heart you cannot be referred to any sure signs either auscultatory or non-auscultatory. There are none such as *taken alone* would determine its existence. But there *are* such, as taken together with certain preparatory and conducive circumstances would make one almost sure of it; the circumstances, I mean, which constitute its clinical history. Now what are they? First there is fever. For many years I have been accustomed

to consider no single symptom, arising at an advanced stage of fever, to be of more unfavourable import than an intermitting or irregular pulse. Though from his general condition I might have no such expectation, yet the state of the pulse alone has made me anticipate the patient's death.

In the fever which has prevailed during the last seven or eight years in the hospitals of London* and which has been characterised by weakness rather than strength, and by petechial eruptions, the morbid appearances after death have been of various kinds and appertaining to various organs. Among other kinds there has been a remarkable softening of textures; and among other organs, such as the liver, the spleen &c. this softening has frequently belonged to the heart. Now, whatever share a softened liver or a softened spleen may be thought to have in determining the fate of the patient, a softened heart may be well conceived to have a greater.

I have been looking over M. Louis's admirable book upon fever and find him laying great stress upon the intermitting and irregular pulse, attesting its formidable import, declaring how few who have it recover, and stating that he has found in almost all of those who have had it and have died, a softening of the heart's muscular structure.

* The *substance* of this lecture was given in 1839 and 1840.

Dr. Stokes of Dublin * has lately been directing attention to the same morbid condition of the heart among the formidable contingencies of fever. And he has done so, with some novelty in his views of the real nature of the thing itself, with a more precise notice of its diagnostic signs and (what is most important of all) with the discovery, that these contain indications which may be safely trusted to decide one of the most difficult points of practice in the management of fever. Dr. Stokes holds this softening of the heart to be a proper and special effect of fever, and its diagnostic signs to be the impulse of the ventricle becoming almost or altogether imperceptible, and the systolic sound at the same time almost or altogether inaudible. And he considers that the impulse and the sound together being thus weakened or abolished, whatever in other respects be the patient's condition, call at once for stimulants as his only means of safety: and that his safety is insured as soon as a fairly perceptible impulse and a fairly audible sound are thus restored to the heart. The impulse and the sound thus ceasing and thus returning are, under the circumstances, diagnostic signs as nearly perfect as can well be conceived.

But there are certain chronic constitutional diseases, in which the blood becomes corrupt in quality

* Dublin Medical Journal, March, 1839.

or deficient in some essential constituent, in its red globules for instance, as in scurvy or chlorotic anæmia. A pulse deficient in power and intermitting is among the characteristics of such diseases, and when death takes place, the heart is found softened.

I have something further to say practically upon this subject of the softened heart which must be reserved for another place.

That other condition of the heart, viz., the conversion of its muscular substance into fat, which acquires an importance from the serious results to which it leads, may be described in a few words.

The healthy heart is always more or less marked upon its surface with streaks of white, and this appearance comes from the deposition of fat in the cellular texture which unites the serous covering with the subjacent muscular structure. It is found chiefly where the venæ cavæ unite to form the right auricle; also at the base of the ventricles and along the line which marks the boundary between the two, and around the great blood-vessels as they emerge from the heart. But when fat is found in more than these situations and in more than the natural quantity, it is not so much added to the healthy substance of the heart as existing at its expense and detriment, and the muscular structure is that which especially suffers. The muscular fibre is sometimes pale and wasted like that of a paralytic limb.

Now the predominance of fat in the heart, whether it be superadded to, or intermixed with, its muscular structure, may be said to constitute a form of unsoundness partaking, in some sort, of the character of disease; moreover, like other unsoundness from disease, it naturally leads to unsoundness from disorganisation. The fat heart ends by becoming also a dilated and enfeebled heart.

During the life of the patient, however, there is (as far as I know) no sure diagnosis of the fat heart, but a probable conjecture only. And even this probable conjecture can scarcely be made while the heart is *simply* fat, and nothing more, but must wait until it has reached that further disorganisation to which it naturally tends, namely, dilatation. But, when dilatation is ascertained by its appropriate signs, if valvular unsoundness, as its cause, be excluded by the absence of endocardial murmur, and if a feeble fluttering movement of the heart be felt at every part of the præcordial region, or beyond it; and if, moreover, the constitutional habit of the man be such as to accumulate fat in all other parts, then it may be taken almost for certain that fat is especially deposited upon the heart at the expense or detriment of its muscular substance. Be it always remembered, nevertheless, that our inference, however correct it may turn out, is drawn, not directly from any express diagnostic signs, but indirectly from coin-

cident circumstances. No murmur reaches the ear to tell us at once that the heart is fat. But we know that the heart is feebler and more capacious than natural. And we know that such, if life last long enough, is ultimately the condition of all fat hearts. Besides, we observe that the patient is *altogether* fat, and so we infer the probability that the heart has not escaped his constitutional peculiarity.

I purposely dwell upon these points. For one principal object I have in view is to bring diseases of the heart to a living test; to stand by the bedside, and there see how much we *know* of them, and how much we *conjecture*, and how, according to degrees of probability, our conjecture is made, sometimes little less than *knowledge*, and sometimes little more than a *guess*. Now we are able during life to conjecture a fat heart with such strength of probability that we almost know it.

It has been said, that from being fat the heart becomes dilated. This is its natural tendency, and, if life last long enough, the event is inevitable. For the present, however, we will not inquire further in this direction. But there is another event which is of much rarer occurrence, and may interrupt its progress to that which is more common. This is its rupture.

My own knowledge of rupture of the heart is limited to a single case. I have, indeed, seen many a specimen of its morbid anatomy; but this

is a different thing from knowing cases. And I have seen some few brought into the hospital dead or dying, in whom, after death, the heart was found ruptured; but this, too, is a different thing from knowing cases. Only in a single instance have I ever witnessed the living circumstances attendant upon a rupture of the heart, and watched the mode and process of dissolution from it. And in that instance the disease of fatness (so to speak) preceded the rupture. To me it was full of instruction, and may be so to others; therefore I will relate it at large:—

R. B. was in his sixty-first year. For several years he had been crippled by the effects of gout. He wheeled himself from room to room in an invalid's chair, and could walk only by the help of crutches. He had never been intemperate, and was now abstemious; yet his sedentary life had made him fat.

I had known him for more than three years. My first acquaintance with him was while he was suffering one of the severest fits of gout he had ever experienced. From that time forth he put himself under my professional care. I visited him occasionally, and did my best to ward off the attacks, to mitigate them when they came, and to make life tolerable under his great infirmities. In truth, after I knew him, his fits of gout were much less frequent and much less severe than they had been before.

One day I was called to visit him, in consequence of an unusual pain he had been suffering. It occupied the entire front of the chest, and passed along both the clavicles to the top of the shoulders, and there ceased, without descending down the arms. It was constant. It had already endured for a day or two, and had become much greater during the last night. His family, who had watched him, and knew how naturally uncomplaining and patient he was, had already taken alarm from something in his looks, which told them that he felt more than he expressed. His pulse was neither more nor less frequent than natural. It was hard and incompressible; but such was its ordinary character. His bowels were more torpid than usual. Not clearly seeing the nature of the present distress, I contented myself with ordering a mustard poultice to the chest, and prescribing some cordial aperient medicine.

On the next day I found that not the smallest relief of pain had been obtained. And now he described more distinctly its severity, which had kept him sleepless and incapable of lying down during the entire night. I examined his chest. The lungs admitted air freely and equably. The respiratory murmur was perfect. The heart beat over a somewhat larger space, and with somewhat more force than natural, but without unnatural sound. He looked more subdued than

on the preceding day. But no new symptom had arisen. His complaint was still of pain, and of pain only. It looked like *angina pectoris* but for its permanence. With some slight hope that it might have a relation to his gouty habit, I ordered half a drachm of *vinum colchici* and a drachm of paregoric to be taken immediately, and again in six hours.

To my great surprise, on the following day I found him quite free from pain. He had taken the first dose of *colchicum* and paregoric, and then the pain began gradually to leave him. He took the second at bed-time, and passed a comfortable night. The medicine had acted upon no secretion. It seemed to have produced no sensible effect beyond the suspense of the pain, if that really was its effect; only it had left a slight nausea. Conditionally, in the event of the nausea first passing away, I directed him to take the same dose of *colchicum* and paregoric at night. The nausea did cease, and the remedy was taken. The next day he cheerfully reported, that he had passed a good night, and had been and still was free from pain. But the nausea had returned. This state of things admonished me to desist from medicine altogether. The nausea prohibited the further use of *colchicum*, and the total absence of pain left nothing to be done at present but to wait and to watch.

Together with the events of this important

case, let us have regard to the article of *time*. It was Monday when I first saw the patient, and now it was Thursday. Already, for two nights and for a part of two days, the pain had been suspended, and it was about to be suspended for a night and a day longer; a circumstance which in the sequel will appear quite unaccountable.

Well; his state was now so hopeful, that my attendance on the following day seemed unnecessary. And, enjoining a total abstinence from medicine in the mean while, I appointed to visit him again on Saturday.

But on the next day, Friday, I was suddenly called to him. It was six P. M. I found that, about an hour before, the pain had returned with far greater severity than ever. He was deadly pale, and from the centre to the extremities of his body he was cold as marble, and streaming with perspiration; but his pulse was of a good strength, and his heart was contracting regularly and forcibly, and now, for the first time, (according to my observation) with a loud systolic murmur, audible in the præcordial region, and not in the arteries. I administered a large dose of opium with æther and ammonia. Visiting him again in an hour or two, I found the pain unabated, and his pulse beginning to sink. I staid with him through the night, still giving at intervals opium and æther and ammonia, and applying external warmth, but all to no purpose. Still

the pain did not lessen. Still he looked and he felt like a corpse, he was so pale and so cold. At four in the morning (Saturday) the pulse finally ceased to be felt in the arteries, while yet the heart was perceived by the ear to move, but not by the hand. In this state he survived seven hours longer, until, with his mind clear to the last, he died at 11 A. M. Let me add, what I shall not soon forget, that this good man endured eighteen hours of mortal agony with wonderful patience and resignation.

Upon examination after death, all the interior structures of the body were found more loaded with fat than its external appearance would have led me to expect. We looked only superficially to the abdomen, where we found nothing remarkable but a vast accumulation of fat within the mesentery. Our attention was chiefly directed to the suspected seat of disease—the chest. Here the lungs were perfectly healthy. The heart was a good deal larger than natural as a whole, and incased in fat. It was upon its right side that the fat was accumulated to the greatest amount, and its muscular substance was every where very flaccid and very thin, and became thinner and thinner as you approached the apex, where it was reduced to a mere line. Yet, thin as it was, it was quite healthy in colour, and preserved all the visible characters of muscle without any intermixture of fat. The fat was all exterior to it. The

capacity of the right ventricle was notably larger than natural. Its internal lining was stained of a deep red. Its orifices were free, and its valves healthy. On its left side it was less covered with fat. Here the ventricle was considerably dilated. The muscular substance was considerably hypertrophied. It preserved its healthy character, both of colour and consistence in the external parietes; but in the septum it was pale and soft, manifestly in consequence of fatty degeneration. In the septum, at its posterior juncture with the parietes, there was an oblique rent passing through it from ventricle to ventricle. On the side of the left ventricle it was an inch and a half in length; on the side of the right it just opened at a point. In truth, while we were examining the right side, the rupture passed undiscovered. The orifices of the left, as of the right ventricle, were quite free, and its valves healthy. The coronary arteries contained some atheromatous deposits, but were quite pervious. The aorta was healthy as far as its arch. It began to be studded with atheromatous and earthy matter in its descending portion.

When this case occurred to me, it brought to my recollection a specimen of rupture of the septum preserved in the museum of St. Bartholomew's. The patient from whom it was taken did not die in the hospital. I did not see him; but I took some pains at the time to ascertain the cir-

cumstances of his death from those who witnessed them, as well as those circumstances of his life which could be fairly ascribed to the state of his heart found upon dissection; and the following is the record which I then made:—

A gentleman, sixty years of age, inclining to corpulence, had for several years been liable to occasional attacks of severe inflammation of the lungs, requiring copious blood-letting for their cure. In the month of February, 1829, having suffered such an attack during the previous winter, and been relieved in the usual manner, he began to experience a new complaint. This consisted of pain beneath the sternum, suddenly coming and going, attended by pain or numbness down one and sometimes down both arms, and by something more than pain, an indescribable anguish, generally within the chest. The attack would seize him as he walked along the streets; whereupon he would stop, turn into a shop, rest a while, and then proceed. The weather was foggy at the time, and to it he was willing to ascribe his new complaint. But the attacks continued to recur when there was no foggy weather to account for them. In the month of April he suffered two; one on horseback, the other in bed and at night.

One day, towards the end of the same month, he was suddenly seized with this pain beneath the sternum and down both arms. It was severe and

agonizing, beyond what it had ever been before: and immediately his aspect became that of a dying man, pale and purple about the lips; his pulse very frequent, and hardly perceptible. In this condition, by the help of stimulants, he was still kept alive three days.

The state of the heart, as it was found after death, is thus described in the catalogue of the museum: "The cavity of the right auricle is larger than natural, and its membranous lining is thick and opaque. The tricuspid valve is thickened, and its lining opaque. The aortic valves are a little thickened, and there is a soft matter deposited beneath the lining of the aorta just above the valves. The coronary arteries are thickened, and there is bony matter deposited between their coats. A rupture of the septum dividing the ventricles has taken place near its union with the posterior wall of the heart, by which a free communication is made between the two ventricles. On the side of the left ventricle the opening is about two inches in length, and of a semi-lunar form. On the side of the right the opening is much smaller and rounded."

From the description which I have quoted, it does not appear that the septum had undergone any morbid degeneration, which could be thought to give it a greater liability to rupture than any other part of the heart's muscular structure. But such degeneration was so remarkable in the case

which had fallen under my own observation, that I could not help desiring a more accurate examination of the preparation at St. Bartholomew's, if after the lapse of seventeen years it were indeed possible. Mr. Paget and Dr. Ormerod undertook it for me, with the aid of the microscope, and have obligingly communicated to me what they were able to make out: "There was much oil swimming at the top of the jar. The texture of the heart was somewhat soft. On the parts about the rupture were many drops of oil, and hereabout the muscular tissue was evidently disorganized, for it appeared as irregular granular cords, without any transverse striæ, which elsewhere were well-marked. But there was no distinct fatty degeneration of the muscular fibres."

It appears then that in this, as in the other case, the septum had undergone a morbid change of structure, rendering it more liable to suffer rupture. But the change was not exactly of the same kind in the two cases.

LECTURE XXVII.

UN SOUNDNESS OF THE HEART FROM DISORGANISATION.

— HYPERTROPHY.— ATROPHY.— DILATATION.— CONTRACTION.— WHAT THEY ARE IN THEMSELVES, AND IN THEIR COMBINATIONS. — THEIR CLINICAL DIAGNOSIS.— HOW FAR ATTAINABLE BY AUSCULTATION. — THEIR CLINICAL HISTORY CONTAINED IN PRIOR DISEASES CONDUCIVE TO THEM.— THESE DISEASES MAY BE EITHER IN THE HEART OR IN OTHER PARTS OF THE BODY.— OBSERVATIONS UPON THEIR CLINICAL HISTORY, AS CONTAINED IN PRIOR DISEASES OF THE HEART.

WE come now to those affections of the heart which may be usefully classed together under the name of unsoundness from disorganisation. They consist in alterations of size and shape and bulk and capacity, and are the same which are commonly denoted by the terms hypertrophy, atrophy, dilatation, and contraction. And I shall continue to use the same terms. I only designate them, *as a class*, by this name of “unsoundness from disorganisation,” that it may help us to keep in mind the important truth, that disease properly so called does not enter into the actual process of their formation.

Disease or any unsoundness left by disease within the heart may indeed furnish their original

and conducting cause. But the things themselves are still different. Adhesion of the pericardium and thickened valves and strictured orifices may be first the spring and then the motive, the never-ceasing and often the ever-increasing motive, of the heart's contracted or dilated cavities, of atrophy or hypertrophy of its muscular substance. And thus in the end nothing is more common than for the same heart to present a complex of unsoundness from disease, and of unsoundness from disorganisation. Still (I repeat) the things themselves are different. And their very relation to each other, and their frequent union in the same subject make it the more necessary to remember that they are so.

It was but fit, however, that in the order of our proceeding we should preserve the link of connexion which pathology has pointed out between the two; and treat of that first which naturally comes first, and then of that which naturally follows. So much for the sake of arrangement. But now, when we are come to these latter affections, to these forms of unsoundness from disorganisation, you will find that it is with them as it is with every thing in the shape of disease or disorganisation throughout the body, viz. that while each according to its kind has one mode or process of formation which is peculiarly its own, it may have twenty different causes capable of originating it and conducing to it. Thus there is one process of hypertrophy and one

of atrophy, one process of dilatation and one of contraction of the heart's cavities in all cases. But the cause may be prior disease of the heart itself in one case, of the aorta in another, of the lungs in a third, deformity of the chest in a fourth, and the morbid quality of the blood in a fifth.

Hypertrophy and atrophy, dilatation and contraction, seem to carry with them their own meaning. What they are might almost be left to your general conceptions. Still some short description is needed to bring the things themselves fairly before the mind, ere we proceed to give a practical commentary upon them, and to dwell upon them more at large.

Hypertrophy is a simple augmentation, and atrophy is a simple diminution of bulk and consistence in the heart's muscular substance. In hypertrophy its muscular substance is more red than natural, its *carneæ columnæ* are increased in thickness, and its proper fibrous texture is everywhere more strikingly manifest, while there is no interstitial deposition of matter new in its kind. In atrophy its muscular substance is less red than natural, its *carneæ columnæ* less developed, and its proper fibrous texture less distinguishable. But there is still the appearance of muscle shrunk and withered as if from an insufficient supply of nourishment.

Of dilatation and contraction really nothing

more can be said by way of description than that the one consists simply in increased capacity, and the other simply in diminished capacity of one or more cavities of the heart.

But these forms of disorganisation affecting the muscular substance and the cavities of the heart bear relations to one another, which should be noticed. Hypertrophy and atrophy seldom occur while the cavities retain their natural capacity. And dilatation at least, if not contraction, is seldom found without augmentation or diminution of bulk in the muscular parietes.

Upon this subject, of the capacity of the heart's cavities and the bulk of its muscular substance and the relation which one bears to the other, some explanation is needed to prevent erroneous notions from the language often employed. *Simple* dilatation is indeed often spoken of, implying augmented capacity of the cavities, while the muscular parietes still retain their natural thickness. Now consider, and you will see that the heart in a state of dilatation cannot preserve its normal thickness on any other terms than these, viz. that in exact proportion to its expansion and while that expansion is going on, something should be continually added to the bulk and substance of its muscular fibres. Hence what appears to be and is often called *simple* dilatation, is in fact and ought to be called dilatation with proportionate hypertrophy. And

what appears to be and is often called dilatation with *moderate* hypertrophy, is in fact and should be considered dilatation with *excessive* hypertrophy.

Again consider, and you will see that the heart when its cavities are dilated and its walls thinner than natural need not on that account be considered in a state of atrophy. Here there has been a lengthening and expansion of the muscular fibres, but no diminution of their substance. In obedience to a pressure from within they have yielded and spread themselves over a larger space. They have lost nothing. They have suffered no atrophy; only they have not, as in the former case, experienced a proportionate hypertrophy. They have not, in proportion as they have lengthened and expanded, received additions to their bulk.

But at the bed-side we must be content to know less than we know anatomically, and to use terms which designate just what we know and no more. Practically and in relation to living circumstances the terms commonly employed, when I was a student, to denote these complex disorganisations involving the cavities and muscular structure of the heart, were very good. They regarded the ventricles more especially. The terms were active and passive dilatation.

They do not reach anatomical differences, but they vouch for as much as our diagnosis can really

compass during the life of the patient. Active dilatation implies a more capacious ventricle with such a change of its muscular structure as is calculated to augment its power; whether this change be a non-apparent but real (what I have called a proportionate) hypertrophy, or an apparent and so an excessive hypertrophy. Passive dilatation implies a more capacious ventricle with such a change of its muscular structure as is calculated to diminish its power; whether this change be a real atrophy or an expansion and elongation only of its muscular fibres.

Active dilatation may appertain to every cavity of the heart simultaneously; and so may passive dilatation. But such occurrences are rare; for one cavity being naturally more liable to this species of dilatation and another to that, it most frequently happens that specimens of both conditions are found in the different cavities of the same heart.

Contraction of the heart's cavities is a much rarer pathological change than their dilatation; and when it occurs, it has hypertrophy or atrophy as less certain accompaniments.

A few years ago pathological anatomy had come to regard two particular forms of disorganization as the natural opposites of each other, and was fond of using names chosen on purpose to mark their contrast. These names were — eccentric hypertrophy, and concentric hypertrophy. The

eccentric was that in which the cavity goes on expanding and enlarging ; and the concentric that in which it goes on closing and diminishing, as the muscular substance becomes thicker and thicker.

But it turns out to be more than doubtful whether this last combination have a real existence during life and whether it do not arise during the act of dissolution and result from the very mode of dying ; in fact whether *concentrically* hypertrophied hearts be not hearts, which “being more or less hypertrophied, death has surprised in all the energy of contraction.” This combination of thickened walls and diminished cavities has been found in those who have died violent deaths and in executed criminals. Dr. Budd met with it in many instances of sudden death from cholera. After maceration the cavity of the ventricle, which before would not contain a blanched almond, became of its natural capacity.*

Still there is no doubt that during life the cavities of the heart suffer diminution of their natural capacity. There are peculiar forms of preceding unsoundness *from disease* which lead to peculiar forms of subsequent unsoundness from *disorganization*. They produce contraction of one cavity and dilatation of another, or of all the rest. Thus the left ventricle being diminished in capacity, the left auricle is enlarged ; and some-

* Budd, in Med. Chir. Trans. xxi. 296

times not the left auricle only but the right auricle and ventricle also ; nay more, some or all the blood vessels leading immediately to and from the heart may be at the same time dilated except the aorta, which is contracted. Stricture of the mitral orifice is calculated to produce it all. Unsoundness of the mitral valve from disease may lead to this vast amount of unsoundness from disorganisation.

Of the forms of unsoundness from disorganisation described by morbid anatomy those which I have noticed are the principal in their kind. They are also the most frequent. They embrace moreover the pathological consequences of all the rest, and therefore may stand representatively and virtually for them all ; and so be taken for the text of our practical commentary.

First then for their clinical diagnosis. This is chiefly an affair of auscultation. In our first lecture after describing the natural sounds, impulses and resonances of the heart, we considered their variations of degree and extent. And then we enquired what it was that such variations whether of excess or defect, according as they are differently combined in individual cases, must be taken to denote ; and we found in them the express auscultatory signs of these forms of disorganisation which have just been described, namely, dilatation or contraction of the heart's cavities and thickening or attenuation of its muscular structure. I refer

you back to what was then said instead of repeating it in this place.

It must be admitted however, upon this matter of the capacity of the heart's cavities and the bulk of its muscular substance, that accuracy of diagnosis is attainable only in respect of the ventricles. Of the auricles auscultation (as far as I know) conveys no direct intelligence. What their state may be we are left to conjecture from other and indirect signs, and chiefly from the previously ascertained state of the ventricles. And of the ventricles themselves, when the question is of their capacity and their bulk, the left is far more within the reach of accurate diagnosis than the right. And this more accurate diagnosis of the left may come from auscultation alone, while the less accurate diagnosis of the right comes partly from direct auscultation of it, and partly from certain conditions of the venous circulation and partly from the previously ascertained state of the left.

We come next to the clinical history of these same disorganisations of the heart, of its hypertrophy and atrophy, its dilatation and contraction. By clinical history here as elsewhere I mean the assemblage of living phenomena which experience has found to be prior and preparatory and conducive to them.

Truly it is a vast subject this of the clinical history of the disorganisations in question; and truly it must be a vast experience which embraces

it, and peculiar difficulties lie naturally in the way of it. And it is well you should be antecedently aware of all this, that you may be better able to exercise a cautious judgment upon what can only be laid before you summarily and concisely.

Always then keep in mind the great difference there is between acute diseases and chronic disorganisations of the heart as to the way in which we come at our knowledge of the conditions conducive to each respectively. How much further will each man's own observation go in the one instance than in the other ! By the time he has seen a few cases of endocarditis and pericarditis, he has an experience of his own of all the reputed conditions out of which they arise. The cases themselves have been entire cases. He has watched them from first to last. Their conditions have been such as strike the senses and emerge rapidly ; and he has seen them as they have emerged. But he may have gone on witnessing cases of hypertrophy and atrophy, of dilatation and contraction half his life, and still found that his own experience has not yet certified to him all the reputed conditions conducive to them. Few, perhaps none, of the cases which he has witnessed have been entire cases. And observation runs sadly to waste when it is made upon cases piecemeal.

Again consider, when we have to deal with what comes first or comes early in a series of

pathological changes, as endocarditis and pericarditis usually do, that then we have seldom far to seek for the conditions that lead to it. The few steps of our inquiry are tolerably easy and sure. We have perhaps only to examine the circumstances attending the last transition from health to sickness that took place some two or three days or two or three weeks ago, and there we find them. But when we have to deal with what comes last or comes late in a series of pathological changes, as hypertrophy and atrophy, dilatation and contraction usually do, then it must be by a more far-seeking, by a more difficult, and a more fallible research that we are to make out the conditions that lead to it. It will not be enough to note some recent transition from health to disease, but (what is a far harder task) we must make good the links which have been coupling disease with disease and disorganisation with disorganisation for years and years together.

In seeking to make out the clinical history of these affections we must be content with a mixed inquiry, practical in part and pathological in part, made up of our own experience and of others' experience, and of what we know or believe, from the nature of the thing, either must be or is likely to be.

Hypertrophy and atrophy of the heart, dilatation and contraction of its cavities seldom, perhaps never, take place but where some disease or

unsoundness has previously existed, either in the heart itself or in other parts of the body, from which they are derived as a natural and necessary consequence. I say perhaps never, because the instances are very few in which such disease or unsoundness is not either already known during life or discovered after death; and in those very few where it is not apparent either during life or after death, the probability is greater that we had not penetration enough to find it out than that it did not exist.

Now, such being the case, they can hardly be said to have any clinical history which is properly their own. It must be greatly involved in the clinical history, whatever it may be, of any prior disease or unsoundness within the heart or without it from which they are derived. Hence all that has been said of each and every disease of the heart which we have hitherto described, of endocarditis and pericarditis and the permanent unsoundness which they leave behind, of thickenings and transformations of the valves and stricture of the orifices, also of inflammation and softening and degeneration of the muscular substance, what was it but a long recital of the conditions prior, preparatory or conducive to these forms of disorganisation which we are now considering? Thus a large part of their clinical history has been amply set forth already, although it was not specified as such at the time. But a

large part remains to be considered, viz. that which is found in prior disease or unsoundness of other parts.

For the sake, however, of marking some important practical considerations, I wish to revert shortly to the connexion between prior forms of disease or of unsoundness from disease in the heart itself, and its subsequent forms of unsoundness from disorganisation. The clinical history of the second is contained within the first, which has been pathologically conducive to them.

Now, such clinical history of disorganisations of the heart may, according to the nature of its prior diseases, be plain and manifest and most instructive, furnishing a living illustration of their pathology; or it may be obscure and uncertain, revealing little or nothing of their pathology during life and leaving it to be made out by what may happen to be detected after death. Take a survey of cases and see how they bear out this view of the matter.

In many cases of hypertrophy or atrophy, dilatation or contraction, we are apt to learn, upon inquiry, that there was long ago an attack of acute rheumatism and that then the heart suffered detriment and from that time forth it had never been right. Furnished with this notable fact and knowing the heart's present condition we are enabled to read the cases backwards from their end to their beginning and see through all their

course both clinically and pathologically. We now find hypertrophy or atrophy of the heart's muscular substance and dilatation or contraction of one or other of its ventricles. But before these there was adhesion of its pericardium or stricture of one or other of its orifices; and one or both of them still remain. And still before these there was inflammation of the pericardium or inflammation of the endocardium or of both, and the effects of one or of both were imperfectly repaired. And still, even before the inflammation or coincident with it, there was a rheumatic fever. It may have taken one or two, five or ten, fifteen or twenty years to bring results to their final accomplishment in different cases. But where there is so notable a fact to begin with and so clear a succession and development of pathological consequences from first to last, the matter might be simplified and the truth would be preserved and our conception of it assisted, if the whole were looked upon as one continued malady.

There are no cases belonging to the same class which have their clinical and pathological history so satisfactorily made out as these. Other cases, in which prior disease of the heart and its unrepaired effects are summed up in these same forms of unsoundness from disorganisation, give comparatively obscure tokens of their origin and progress. We find in them no notable fact which

came first, and was manifestly exordial to all that followed. And the want of it spoils the completeness of their clinical history.

Call to mind what has been said of chronic diseases of the endocardium, producing cartilaginous, atheromatous and earthy deposits. How uncertain and conjectural were our notions of any living conditions preceding, preparatory and conducive to them. There is large experience of these forms of unsoundness from chronic disease co-existing together with the forms of unsoundness from disorganisation, which we are now considering. And whenever this is the case, we venture to conclude that the conversion of the valves into cartilage, atheroma or bone came first, and that the hypertrophy or atrophy, the dilatation or contraction followed. Pathological reasoning tells us that it must be so; although living conditions do not mark the time at which one is superadded to the other.

Call to mind too what has been said of the aneurismal heart and of the fat heart, and how obscure was their clinical history. Obscure also must needs be the clinical history of the hypertrophied or attenuated and dilated heart when they follow them as their natural consequences.

But something yet remains to be mentioned which, having a prior existence in the heart, may and does lead to its disorganisation; something, which has not strictly the nature of disease,

although disease may follow it, and which I have not yet found a fit place for describing. I mean accidental injury.

I wish then now to direct attention to (what I will venture to call) shocks of the heart, in which it suffers hurt from violence. From this hurt or from disease which follows it, or from both, disorganisation, especially in the form of hypertrophy and dilatation, is apt to follow. Thus these shocks of the heart become part of the clinical history of its disorganisation and claim to be considered in this place. The subject (as far as I know) has nowhere been treated of. My own acquaintance with it is scanty and imperfect, but still enough to show me that it has very important relations, both pathological and practical. Being however of a distinct nature it had better be reserved for separate consideration in another lecture.

LECTURE XXVIII.

UNSOUNDNESS OF THE HEART FROM DISORGANISATION
SOMETIMES TRACEABLE TO AN ACCIDENTAL SHOCK
WHICH IT HAS SUSTAINED.—THIS SHOCK A PART OF
THE CLINICAL HISTORY OF ITS UNSOUNDNESS.

ACCIDENTS sometimes help to illustrate the operations and effects of disease as poisons illustrate the operations and effects of remedies.

The following case was furnished to me by Dr. Bence Jones:—

“ A stableman twenty-eight years of age was admitted into St. George’s Hospital. He was suffering, and had suffered for twelve months, severe palpitation of the heart, and was able to mark distinctly the moment of its commencement. It was one day just after running a horse down the yard to show off his paces to a purchaser. He had never had acute rheumatism. His lips were blue, his breath short, and his left side painful. He had a dry cough. His bowels were confined and his urine free. It was ten weeks before his admission that his cough and dyspnœa had begun to be particularly distressing. Auscultation found dulness in the præcordial region over an extent of four inches square, the heart’s

impulse increased and its first sound prolonged with a low blowing (endocardial) murmur over the aortic valves, and its second sound indistinct. He was bled three times under the urgency of his cough and dyspnœa. These however continued to increase. Five weeks after his admission his legs became œdematous, and in two weeks more he died.

“On examination after death three pints of fluid were found in the right pleura, and the heart enormously large. In length it reached from the second to the eighth rib, and across the base of the ventricles it measured six inches. The left ventricle was moderately hypertrophied and very largely dilated. The mitral valve was healthy, and the aortic was slightly thickened, and moreover had suffered rupture of a peculiar kind. One of its septa was torn away from its attachments, and thus two of its pouches were reduced to a single irregular one. The right ventricle was dilated, but both the auricles preserved their natural state. In the ascending aorta and in its arch there were atheromatous deposits. The liver was very large, and the spleen and the kidneys were healthy.”

Cases running parallel with this are not common, but yet frequent enough for most medical men of experience to have met with one or two. Upon some violent effort, such as rowing, leaping or boxing, or some violent succussion by an ex-

ternal force, a shock is felt by the heart as of an injury done to it; pain, palpitation, and perhaps a sense of approaching death may follow. But death does not then actually take place. And the ultimate result is a good deal according to the treatment which the patient meets with at the time.

I have seen such accidents with such immediate effects terminate in simple palpitation or excess of impulse. This simple palpitation has been constant for a few months, and then it has been occasional only upon some known excitement, and then it has ceased altogether. Or it has been permanent and has never afterwards ceased, and then in process of time there have arisen moreover the sure signs of hypertrophy and dilatation. Again I have seen such accidents terminate in palpitation with an endocardial murmur, and both have been permanent, and in process of time the sure signs of hypertrophy and dilatation have been superadded to them.

After we have been engaged for some years in the practice of our profession we come to have a great experience in *fragments* of cases. We see abundance of cases at their commencement or in their progress, of which we never witness the termination. But such experience is not without value. All I know of the results which follow sudden shocks proceeding from accident and severely felt and resented by the heart, such as

simple palpitation and palpitation with an endocardial murmur, palpitation enduring for a time and then ceasing altogether, palpitation abiding permanently and after a while having hypertrophy and dilatation added to it, all this has (I confess) come to me as yet chiefly from *fragments* of cases; cases, of which I have not seen the whole or witnessed the event.

But a single entire case often furnishes the key to many *fragments* of cases. Thus Dr. Bence Jones's case serves to explain others which have not run on to the like fatal result.

I was called to see a gentleman in the prime of life and having the aspect of perfect health, whose heart was beating with excessive impulse and with a loud systolic endocardial murmur, audible in the præcordial region, but not in the arteries. He was not incapacitated for moderate exertion, but found it needful to be very cautious what he did and how he moved, lest his palpitation should run on to a painful degree. I satisfied myself that the left ventricle had undergone a certain amount of hypertrophy, and that the mitral valve was unsound. But how came this serious detriment of the heart in one so young and otherwise so healthy? Had he suffered an acute rheumatism? No. Had he suffered any attack of fever or inflammation in which his heart was known to have been involved? No. But he had suffered *an accident*. A twelvemonth or more ago he had

experienced (what I have called) a shock of the heart in rowing. A perilous state of things immediately ensued. He at once sought the advice of Dr. Chambers, who treated him according to the kind and severity of his symptoms, which were those of acute inflammation, of endocarditis. He bled him and brought him under the influence of other antiphlogistic remedies, and so saved his life. But he did not procure a perfect reparation. Permanent unsoundness was left behind; unsoundness of a valve, which though it proceeded from accident was tantamount to unsoundness from disease, and like it was ready to produce unsoundness from disorganization. In truth now after the lapse of a twelvemonth it had produced hypertrophy of the left ventricle.

If in this case we inquire the nature of the injury suffered by the heart at the time of its first shock, Dr. Jones's more complete case must supply the key to it. And thus we cannot avoid believing that it was a rupture of the mitral valve.

Two more years have past since this gentleman was examined by me. I know that he still lives and bears the appearance of health, but still displays the same symptoms referable to the heart, and suffers the drawbacks upon his freedom of bodily exertion, which belong to unsoundness of the mitral valve and hypertrophy and dilatation of the left ventricle, but all moderate in degree.

It is pretty plain, in what point of view these shocks of the heart, attended with present structural injury, should be practically regarded. Any structural injury, inflicted by violence, forthwith has disease appendant to it. And, if it be of an external part and within our reach, we can both treat the injury and treat the disease, the one by our manipulations, the other by our remedies. But if it be of an internal part and beyond our reach, we can only treat the appendant disease. The rupture of a valve by shock of the heart forthwith has inflammation appendant to it. Yet we can only treat the inflammation and must leave the rupture to itself. Thus, respective to their treatment these shocks of the heart are to be regarded in the light of disease.

Not less are they to be so regarded, respective to their results. Our treatment, though it be only addressed to the appendant inflammation, may be followed by the perfect reparation both of the inflammation and the injury: or our treatment may save life, but fall short of effecting a complete reparation, and permanent unsoundness may remain. How much this unsoundness is made up of the half-repaired injury and how much of the half-repaired inflammation we cannot tell. But in process of time hypertrophy or atrophy, dilatation or contraction are added; and thus these cases, though they originated in accident, at last fall practically into the category of unsound-

ness from disease leading to unsoundness from disorganisation.

Now the cases, in which a present hypertrophy or atrophy, a dilatation or contraction are clearly traceable back to a *shock* of the heart, though they are not frequent cases upon the whole, are peculiarly interesting. And those, to which reference has just been made, may be taken to represent the most interesting of their kind, for they seem to display very intelligibly the manner in which events come to pass. The original *shock* of the heart involved an injury of one of its organic textures and the rupture of a valve; and the effects of that injury or of its appendant inflammation or of both, being incompletely repaired, became the manifest cause conducive to its disorganisation.

But there are cases in which we have the present disorganisation of the heart and the prior *shock* of the heart, yet we do not clearly see the intermediate agency by which the one has been brought out of the other; we have no sure evidence that the *shock* was attended at the time by any real injury of its organic textures.

Something, nevertheless, must have then occurred to make the heart palpitate ever afterwards and ultimately lead to its organic unsoundness. But what could it be? Can no other textures of the heart suffer mechanical injury and even rupture except its lining membrane and

valves? It is mainly the muscular structure which is involved in the change of bulk and change of capacity constituting the eventual unsoundness. May it not be the muscular structure which suffers the primary injury? Indeed it may be, and it probably is; but the fact is utterly incapable of proof. Enough has been said in the two last lectures to show how strangely covert and secret and beyond the reach of clinical observation are all the chief diseases and injuries which primarily affect the muscular structure. It may suffer acute inflammation and purulent deposits among its fibres; it may suffer chronic inflammation and penetrating ulceration; it may suffer a complete disruption of large extent, and yet put forth no distinctive signs of one or the other during life. That the heart's muscular structure is penetrated with pus in one case, ulcerated through in another, and rent in twain in a third, are facts which are left for death to disclose. And, if its greatest diseases and its greatest injuries thus lie hid during life, are those of smaller account, such as partial ulcerations or a strain, or any kind or degree of mechanical hurt which may be conceived to come from a shock, likely to make themselves more surely known?

But these shocks of the heart, though nobody knows what they really are, yet have emergencies which need to be treated at the time of their occurrence. And treated they have often been

successfully in different measures. In some life has been saved, no small thing surely! And in some, moreover, evil consequences have been altogether prevented, and in some postponed. I have a few more fragments of cases worth relating for the sake of what they seem to teach practically. I will tell them as shortly as they can be told.

A young man between twenty and thirty, who had lived very hard in the way both of incontinence and intemperance, was seized in the midst of some vigorous pastime (I think it was rowing) with sudden pain of the heart and excessive impulse and the sense of approaching death. His physician, ministering to present emergencies, bled him largely. And the relief that followed the remedy was so marked and manifest to the feeling of the patient and so instantaneous that he was sure it saved his life. But though his life was saved, abiding pain and abiding palpitation still kept it in jeopardy, for they incapacitated him for exertion during many weeks, and in the meantime occasionally rose to the same excess and were accompanied by the same sense of dissolution as at first, and needed, and were relieved by, the same remedy.

Now, it was not until after the lapse of two or three months from the original attack that this person fell under my observation. He had then returned to the business of life, but he was ill able to fulfil it. Palpitation of the heart was still a

check upon all bodily exertion and all mental effort. I have now known him and seen him at intervals for more than two years, and still the palpitation remains. I find simple excess of impulse without any unnatural sound, but I am not certain that the heart has undergone any degree of hypertrophy. Twice or thrice during these two years the palpitation has run on to excess, and a death-like feeling has come over him. He is engaged in a profession. But whatever he does, business and pleasure, and eating and drinking, are all under the restraint of continual watchfulness for the sake of moderating the palpitation of his heart.

What was the nature of the injury originally incurred and what is the kind of malady at present suffered in this case I cannot tell; but whatever they be, they distinctly proceeded from a shock of the heart more than two years ago.

Take another case. A young man twenty-two years of age was with his regiment at the Cape of Good Hope. He had been extremely intemperate and incontinent in his habits for two years and more, and he had suffered occasional palpitation of the heart. One night he went to a ball, and danced till morning, and then plunged into a cold bath and appeared on parade. But he found himself brought to a stand by violent palpitation. He felt as if his heart had suffered injury, and he was incapacitated from duty from that very hour.

But he had not then the death-like sensation, which is apt to come with the shock. Yet he did not escape it. For about a fortnight afterwards the palpitation, which had never ceased, suddenly ran on to extreme violence, his lips turned blue, pain seized the left side and he thought himself dying. He was at once largely bled, and felt sure that the bleeding saved his life; and three days afterwards he was cupped with great relief. His life however was still considered to be in jeopardy for a month. When he could be safely removed he was sent to England. It was five months from the time that the heart may be supposed to have received its shock, before I saw him. He had been sixty-eight days at sea, and in England for a month. The quiet of the voyage had brought down his palpitation almost to nothing, and, when he reached England, he believed himself almost well. But his palpitation had returned and had been increasing for the month he had been at home, although he had been passing the life of an invalid. I found him suffering simply palpitation. I thought the sounds of the heart loud, but otherwise quite natural. Moreover, I perceived a slight bulging of the ribs over the præcordial region, but I could not satisfy myself of any undue extent of præcordial dulness, and upon the whole I could not make up my mind whether there was, or was not, any degree of hypertrophy.

This young man continued to visit me at intervals of about a fortnight for three months. He was enjoined and (I believe) he practised the greatest care to avoid every thing which could be thought capable of conveying an injurious impression to the heart either through the body or through the mind. Nevertheless the heart did not cease to beat with some excess of impulse at all times, which very moderate bodily exertion and very moderate application of the mind to business were sure to increase. And at the end of the three months I had more fear of hypertrophy than at the beginning.

The issue of these two cases, of the one after more than two years, and of the other after nine months is still in suspense. The issue to be apprehended is progressive hypertrophy and dilatation. In both, I consider that life was saved, and that these disastrous terminations have been thus far postponed, and may possibly be prevented, mainly by the treatment fortunately employed at the time of the shock, and by the extreme care and discipline to which the patients have ever since been subjected.

Such treatment and such care and discipline are sometimes successful in the largest sense, as the following case will show. A friend of mine, then two or three and twenty years of age, was dining at some distance from home when a messenger came to tell him that his father's house was

on fire. Off he set as fast as he could. And running down Oxford Street he came in fearful collision with a man who was running in equal haste the other way. Down they both fell. My friend recovered himself. What became of his antagonist he never knew. He himself crawled home with some difficulty. Further than this I am not informed what was the immediate effect of the shock. But from that time he was seriously ill for many months. His symptoms were altogether referable to the heart, and consisted of excessive impulse and pain. He was attended by the late Dr. Baillie, who bled him largely. The remedy must be considered to bespeak the nature of the emergency, and the belief of some serious injury or disease sustained by the heart. After the lapse of many months he was allowed to return to the business of life. He had then lost his *constant* palpitation. But for a few years it was wont to return painfully upon occasions of excitement. At length he lost it altogether; and lived five and twenty years after the shock and the perilous illness, which followed it, actively engaged in a laborious profession.

Let me add a notice of two more cases which occurred when I was a student at the hospital. A man passing through Spa Fields one night was unmercifully beaten and plundered, and thrown into a ditch and left to die. Die, however, he did not, but lay there he knew not how long; for he

was insensible. The next day he was found and taken home. He was disabled by the bruises he had received, and by *palpitation* of the heart and *dyspnœa* which he had never complained of before, and was never again able to return to his ordinary occupation. After some months he was admitted into St. Bartholomew's, dropsical, and bearing all the symptoms which denote hypertrophy and dilatation of the heart. He soon died, and his heart was found of a size which was almost incredible. All its muscular substance was enormously amplified, and all its cavities enormously dilated, its pericardium and lining membrane and valves free from disease.

Nearly about the same time a poor fellow died in St. Bartholomew's, who suffered the same symptoms during life, namely, dropsy and excessive palpitation and *dyspnœa*, and in whom were found the same conditions of the heart both in what it did, and what it did not, display of unsoundness after death, namely, hypertrophy of the muscular substance and dilatation of the cavities, with the pericardium and the internal lining perfectly healthy. And this man ascribed his mortal complaint to a paroxysm of anger, and referred its origin distinctly to a particular occasion. He was naturally irascible; and one day his wife having offended him in a transport of rage he seized a knife, and was just plunging it into his own throat, when the poor woman rushed

upon him, disarmed him, and disappointed his purpose. Some neighbours came in and secured him until his rage had burnt itself out. But from that day he had always been sensible of a palpitation of the heart, which had gradually increased until it incapacitated him for work. Then he became dropsical, was admitted into the hospital and soon died. All was the work of not many months.

But is it quite certain in these cases that the hypertrophy and dilatation really came from a material injury done to the heart at the time of the shock? In neither of them did the heart present the visible traces of any such injury as could be conceived to proceed immediately from violence. Still I do not know that any thing short of absolute disruption must necessarily leave the characteristic marks of itself ever afterwards. It is conceivable that the injury itself might not be of a permanent nature, and yet abide long enough to lay the foundation of permanent disorganization. Further it is possible that, in these same cases, causes might have been found in other parts of the body (for such it will presently appear there often really are) entitled to a share in producing what was found in the heart. Nevertheless the shock, that had been suffered in both cases, was a remarkable part of their clinical history. The patients themselves constantly ascribed to it the origin of all their malady. We cannot therefore

exclude it from our consideration, and may venture, without speculating further upon what cannot be proved, to regard it as in some manner powerfully conducive to the hypertrophy and dilatation of the heart, and to the fatal event.

LECTURE XXIX.

CLINICAL HISTORY OF THE HEART'S UNSOUNDNESS FROM DISORGANIZATION CONTINUED. — CAUSES EXTERIOR TO THE HEART CONDUCTIVE TO IT.—DILATATION AND CONTRACTION OF THE AORTA.—CERTAIN DISEASES OF THE LUNGS.—CURVATURE OF THE SPINE AND DEFORMITY OF THE CHEST.—GENERAL DISEASE OF THE ARTERIES.—COINCIDENT DISEASES OF DISTANT PARTS.—LIVER.—SPLEEN.—KIDNEYS.

BEAR in mind that we have been considering the *clinical history* of the heart's organic unsoundness after it is already brought within the scope of *clinical diagnosis*. This clinical history we have thus far found involved in its own prior diseases or its prior accidental injuries, which are tantamount to diseases, and their unrepaired effects. The heart itself then has thus far appeared to contain the conditions conducive to its disorganization.

But the clinical history of the heart's organic unsoundness takes a wider range. Conditions conducive to it are found, beyond the heart itself, even in other organs both near and remote and in the constitution at large !

Of these conditions themselves, in the mode of their operation upon the heart, so as to alter its structure, some are easy, and some are difficult

to understand, and some in the present state of our knowledge, quite inexplicable.

Dilatation of the aorta is often found coincident with active or passive dilatation of one or several of the heart's cavities.

Cases, however, are met with, where dilatation of the aorta subsists without the heart having suffered any change in its natural structure. The question, therefore, naturally suggests itself, whether the coincidence, when it does occur, really and truly exhibits the relation of cause and effect?

Cause and effect! These terms are allowed, indeed, in pathological reasoning; but its subject-matter seldom admits their use in that strict sense which philosophy would require. In pathology, so many counteracting circumstances, known and unknown, are perpetually liable to intervene, that it can hardly ever be said of any thing that it exerts a power out of which some other thing must *necessarily* proceed. The present state of our knowledge will seldom permit us to affirm more than that a certain morbid action, or morbid structure, has its tendency to such and such a consequence—not its sure termination in it.

Thus a dilatation of the aorta may naturally tend to dilatation of the cavities of the heart, while circumstances may be perpetually interfering with the result. Of these, some are easily appreciated.

A dilatation of the aorta may exist, but the still and sedentary life of the individual may postpone or prevent the full force of the injury from being felt by the heart.

Again, since all harm resulting to the heart from the aorta must be through the medium of the current of blood passing from one to the other, it will be more or less likely to take effect according to the greater or less plenitude of the blood-vessels; and thus in the present case of dilated aorta, the full and plethoric will, there is reason to believe, suffer disorganization of the heart sooner and more surely than the pale and exsanguine.

Disorganization of the heart from a dilated aorta being of tardy growth under all circumstances, and being still liable to be further postponed by accidents, it cannot happen contrary to our expectation that death should often take place and exhibit the one without the other.

But by what agency does the heart become disorganized in consequence of a dilated aorta? It is, probably, by its own extraordinary efforts to overcome a virtual impediment to the circulation. Blood being immediately poured from it into a larger space than natural, requires from the heart an augmentation of its motive impulse.

I believe that a dilatation of the aorta is more apt to disturb the action of the heart, and ultimately to injure its structure, when it occurs

as a general enlargement of the vessel over a certain space, than as an abrupt expansion in the form of a sac; and I believe also, the nearer it is found to the origin of the aorta, the more capable it is of producing these effects. *

But an unnatural narrowness of the aorta no less than its dilatation there is reason to place among the causes conducive to disorganization of the heart.

I have not been able to lay my hands upon the notes I took of a case illustrating the point in question, which occurred several years ago. The circumstances, however, were so striking,

* The aorta was found greatly dilated in a certain case, quite from its origin to its arch, and thickly interspersed with bony scales, like drops of white wax which had cooled; and the heart itself so thickened in its whole muscular structure, and so dilated in all its cavities, as to equal the heart of an ox. — *Morgagni*, xviii. 28.

The aorta, in another case, was greatly dilated; quite from its origin to the neighbourhood of the emulgent arteries, and rigid through the whole of this tract, from the deposition of bony lamellæ; and all the parietes of the heart thickened; and both ventricles, especially the left, much dilated. — *Ibid.* 30.

In another, the aorta was dilated from its origin throughout half its descending portion through the chest, its internal lining being discoloured and thickened, and furrowed, and exhibiting here and there some bony lamellæ; while the heart had both its ventricles much enlarged in their capacity, and somewhat thicker than natural in their parietes. — *Ibid.* 34.

that I can trust my memory, I think, for the accuracy of the detail.

A little boy, between four and five years old, and very puny of its age, was brought to the hospital in its mother's arms. Its countenance betrayed great anguish, and its respiration was exceedingly hurried; and there was no part of the chest where the heart could not be felt acting with enormous impulse; at the same time the pulse at the wrist manifested nothing extraordinary. There was, I recollect, no remarkable blueness of the lips, or other evidence of impediment to the passage of blood through the lungs: the hurried breathing seemed to depend upon the simple vehemence of the heart's action.

What could be the nature of the case? The age of the child first made me think of congenital malformation: but all the malformations I was acquainted with were such as had the effect of mixing venous and arterial blood, and distributing it throughout the body. But here no such effect was apparent. My next impression was, that the heart had become dilated in consequence of an adherent pericardium; but the mother could give no account of any rheumatic attack which the child had ever suffered, or of any acute disease whatever which had fallen expressly upon the chest; on the contrary, she had not observed the disorder to arise at any particular time, nor could she trace it to any

particular cause. The child, she said, was healthy for some time after its birth, and it was not until after it was weaned that the "*strange beating*" within its chest was noticed, which had continued gradually to increase.

A few days only elapsed between its admission into the hospital and its death. The manner of its death was peculiar: it suddenly became pale, and the heart, which an instant ago struck forcibly against the ribs, was only just perceived to move; the impulse was gone, and dissolution was looked for the next moment; but in this state, pale and cold, yet apparently sensible, with the heart just moving, and air passing in and out of the lungs, as it were mechanically, the poor child survived during a whole day, and then it ceased to exist.

Upon dissection the heart was found enormously enlarged, and every cavity greatly exceeding its natural capacity. To what extent, or in what parts its muscular structure was thickened or attenuated, I do not recollect; but the most remarkable circumstance which attracted our attention was this—that the aorta, and all its principal branches, while they were entirely free from disease, were by more than one-half less than their natural capacity.

The case upon record which bears the nearest resemblance to that just related, is one reported by Meckel, in the History of the Royal Academy

of Berlin, for the year 1750. The subject was a puny girl, 18 years old. No further account is given of her history than that she had been, from time to time, subject to palpitation and anguish, and trembling of the limbs, from her infancy to her 14th year, and thenceforward the palpitation and anguish had become constant and more severe until her death.

Upon dissection the heart was found enormously enlarged, and the aorta, throughout its whole course, especially through the chest, and all its principal branches, marvellously narrowed. The heart had both its ventricles dilated, and their substance more soft than natural; it had its auricles also dilated, but the *left* to a degree far greater than any other cavity. It was capable of containing the prodigious quantity of twelve ounces, while the corresponding ventricle only contained four. The aorta was not more than half the diameter of the pulmonary artery.

From the history of these cases, it is evident that the narrowness of the aorta and its branches was a congenital malformation, and that enlargement of the heart was a natural and necessary consequence, and perhaps even an indispensable condition for the continuance of life.

But this narrowing of the aorta need not be so extensive as that which has been described, and yet may have the same effect upon the heart in influencing the dilatation of its cavities. A very

limited and partial narrowing may, according to its situation, produce a mechanical impediment, of which the stress may fall upon the heart equally, or almost equally, with one which is more extensive. In a case where the aorta is represented to have been "*contracted* to an amazing narrowness" near the heart, the heart itself is said to have been *dilated* to an extent "never before seen," the dilatation appertaining especially to the right auricle and ventricle.* Surely a contraction of its calibre in this situation would serve as effectually to impede the exit of blood from the heart, as if it belonged to the whole aorta and all its branches. But when contractions of the aorta occur in situations more remote, there is much less certainty of any injury resulting from them to the structure of the heart.

Among the causes exterior to the heart capable of producing its disorganization, we must not omit the consideration of those which are seated in the lungs; for none are better authenticated. Owing to the peculiar structure of the lungs, and their proximity to the heart, inflammation and its consequences (effusions and depositions) may well be conceived to offer impediments to the transmission of blood, which the heart must feel and resent. And they really do so. The effects upon the heart, however, are partial only, and limited to the right side, and consist of dilatation of its cavities.

* Morgagni, xviii. 6.

Whatever diseases of the lungs can so change their structure as greatly to limit the free space for the transmission of blood, if they be diseases of frequent occurrence, must, one should suppose, be all well known as frequent, and almost certain, causes of this partial dilatation of the heart. And in the subjects of pulmonary consumption, where the natural structure of the lungs is often obliterated to such an extent that hardly any free space remains for the transmission of blood, one might expect to find the most numerous instances of such dilatation. But, in point of fact, it is rarely found in combination with tubercular disease of the lungs.

Now, it is not the quantity of impediment within the lungs themselves taken absolutely, but relatively to the quantity of blood required to circulate through them, which becomes the occasion of the heart's dilatation. The impediment may be very great ; so great, that *one half* of the lungs may be solidified, and yet there may be no dilatation of the right cavities, if at the same time the mass of circulating blood be diminished by one-half. This is actually the case in pulmonary consumption. During its progress there are operations at work in the constitution at large, which are daily deducting something from the general mass of blood ; so that in the end, though there be but *little* of the lungs in a pervious condition, yet that little is still

adequate to transmit the *little* blood which remains in the circulation; and thus, though the absolute impediment in the lungs is very great, there is no detention of blood in the right cavities of the heart, and no dilatation of them.

It is remarkable in this disease, how those symptoms which are considered to be of the most fatal omen, seem to arise out of an express provision of nature for prolonging the duration of life. The hectic perspiration, the occasional diarrhœa, the sputa, the languid powers of nutrition, all tend to keep down the current of blood to that measure which can obtain an easy passage through the lungs. On any other terms the patient would die of suffocation suddenly, and at an early period of his disease.

Nevertheless, it is still the tendency of obstruction in the lungs to produce accumulation of blood in, and consequent dilatation of, the right cavities of the heart; although in phthisis pulmonalis, where the obstruction is the greatest, such dilatation is rarely met with, owing to peculiar conditions of the general circulation. The influence of causes seated in the lungs in producing dilatation of the right side of the heart, is best seen in diseases which, while they create great impediment to the transmission of blood through them, may nevertheless subsist for years without much injury to the general health, without special injury at least to the nutrient functions of the body, and without

any notable diminution of the general mass of blood.

Such are the diseases commonly called *asthmatic*, diseases which differ from each other in their essential nature, but agree in certain common effects, such as in impeding the respiration permanently, or at frequent intervals; in permitting the continuance of life for years; and in not diminishing the general bulk of the body, or the general mass of blood, but sometimes even allowing both to increase. According to my own observation, the subjects of asthmatic diseases furnish the most frequent instances of dilatation of the heart from causes seated in the lungs.

Deformity of the chest, resulting from curvature of the spine is justly reckoned among the causes capable of producing disorganization of the heart, especially active or passive dilatation; or, it may be, dilatation both of one kind and the other co-existing in the several cavities of the same heart. The whole chest being distorted and narrowed, and the lungs straitened and imprisoned, and the heart itself displaced and the aorta tortuous, and the liver bearing hard with its external pressure, lead upon the whole to as large an amount of hurtful encroachment of organ upon organ as can possibly be conceived. And this encroachment cannot be without mechanical impediment; and this impediment cannot be without hurt and

hindrance, first, to the functions, and then to the structure of such organs as the heart and lungs.

Of the causes, then, exterior to the heart capable of producing its disorganization, these are they which are the most acknowledged and the best understood; dilatation and contraction of the aorta; certain diseases of the lungs; and deformities of the chest. They seem all to bring about their common result by the one way of impediment to the free passage of blood from the heart into the arteries.

That active and passive dilatations of the heart may result from impediments to the course of the circulation, either real or virtual, is one of those conclusions in pathology most certainly established. But the theory, which is unquestionably just within certain limits, has been enlarged to an extent which neither facts nor right reason will verify; for some have discovered in an aneurism at a remote part of the aorta, or in a plug of coagulated blood in some of its immediate branches, *positive impediments* capable of being felt and resented by the heart, and thus necessitating its disorganization. And others have been too ready in resolving into *virtual impediments* many merely speculative modes of morbid action, which belong to the capillary bloodvessels.

With respect to a real mechanical impediment, it is probable that, in order to become a certain and effective cause of disorganization of the heart, it must be situated either in the heart itself, or

not very remotely from it. I certainly never met with a case myself, and I find none upon record, where, the heart being disorganized, and no disease being found at any of its orifices, and none in the lungs, and none in the thoracic aorta, there was still any mechanical impediment at a remoter part of the vascular system to which its disorganization could be fairly ascribed. When any such distant impediment exists, every collateral artery, given off between the obstructed or contracted portion and the heart, will furnish it an additional security against injury; for how far soever the obstruction is felt from the seat of the impediment, so far these vessels will and must dilate, and will thus, in proportion to their number, re-establish the freedom of the circulation, and effectually secure it.

With respect to impediments arising out of morbid actions in distant parts, I cannot so easily accommodate my mind to an hypothesis as to believe all that is pretended concerning them. I find depositions of lymph in the cellular texture of a limb, constituting what is called a solid œdema; I find tubercular depositions in any organ, such as the liver; I find even simple inflammations of distant parts seriously insisted upon, as if they were well authenticated causes of disorganization of the heart, when they have happened to exist together with it. And the *theory of mechanical obstruction* is brought in confirmation

of the fact. For, say the theorists, where there is inflammation, there must be spasm of the extreme vessels, and spasm is tantamount to obstruction. And again, where there is effusion or deposition of any kind, there must be pressure upon the neighbouring bloodvessels, and pressure must produce obstruction, partial or complete, according to its degree.

Now, by parity of reasoning, there is no conceivable sort of morbid action in any part of the body, which may not be construed into an obstruction of the bloodvessels, and thus conjured into a possible cause of disorganization of the heart.

But, to dwell only on those specified conditions of other parts of which there is no doubt that they hold the place of causes naturally conducive to the heart's organic unsoundness, namely, dilatation and contraction of the aorta and certain pulmonary diseases and deformity of the chest, has our knowledge of them, as such, any real practical use? Indeed it has. For these causes, conducive to its organic unsoundness, are ever at work, covertly or manifestly, in beginning, furthering, and accomplishing it. They are parts of its living pathology. Being parts of its living pathology, they belong to its clinical history so far as during life they can become objects of our knowledge. And in part they can, and in part they cannot.

Dilatation and contraction of the aorta are reserved for detection after death. It is not until then, that they are found to have been covertly working out the heart's unsoundness during life. They did not, and could not enter into its clinical history.

But the peculiar forms of pulmonary disease are cognizable enough during life, and are manifestly seen all along bearing hard upon the heart, and the heart's unsoundness is seen all along growing under them. In the treatment of such affections of the lungs we never disregard what may happen, or what has already happened, to the heart. The lungs, beside what their own impeded functions require for themselves, are perpetually suggesting to us indications, how best to prevent or postpone or palliate the expected or the actual and growing unsoundness of the heart.

Deformity of the chest too is cognizable enough. But it is a thing of degrees. It may be extreme from birth. And then the heart in its first growth may suffer itself to be so wrested from its true place and shape, and from its true bulk and capacity, that its vital functions become impossible, and the child quickly dies. Or it may be such from birth as to make the heart grow shapeless, monstrous, and out of place, and yet allow it to continue the offices of life for years, provided care be taken to avert from it all casual

influences of an injurious sort. Thus the very deformed often reach the age of puberty, and then die; or under a penal vigilance of all occasions, accidents, and circumstances that can harm them, they sometimes attain a moderately advanced period of life.

In almost all cases, where life continues with extreme deformity of the chest, the organic unsoundness of the parts within is complex. The lungs and the heart suffer equally; and, beside the common causes conducive to the unsoundness of both alike, each is continually helping on the unsoundness of the other.

Unquestionably a numerous class of cases still remains, in which the heart is found with its cavities dilated, and its muscular substance in a state either of hypertrophy or of attenuation, while at the same time nothing is discovered to which this disorganization can be expressly ascribed, either in the heart itself, or in the thoracic aorta, or in the lungs, or in deformities of the chest; and we are left to seek in the condition of more distant parts, or in the habits or casualties of the patient's life, or in his previous diseases, for something which will bear to be suspected as the cause or occasion of its production. These cases must now shortly engage our attention.

In the phenomena of health and of disease, there are things concerning which the present

state of our knowledge is totally inadequate to explain how they are or why they are: yet of many such things we may still know more than their bare existence. We meet with peculiar organic diseases, and we may be at a loss to explain the exact physical process of their production; yet we may remark many circumstances so constantly preceding or accompanying them, that we can hardly doubt that there exists between them *some* kind, although we know not *what* kind, of physical alliance. It has never occurred to me to meet with active or passive dilatation of the heart in a body otherwise perfectly sound. The concomitant diseases have not indeed had, at all times, a strictly accountable connection with it; yet they have, in a manner, rendered its existence more intelligible.

The coincidence of disorganization of the heart, especially of its hypertrophy and dilatation, with the marks of chronic disease extensively diffused throughout the arterial system, is very common. The internal lining of the arteries, here and there, in various situations, and upon the whole to a great extent, has lost its transparency, and become a little thickened, and dotted with cartilaginous and atheromatous and bony deposits; but nowhere has its change of structure been such as could be thought capable of producing injury simply by mechanical impediment. And this may be all that is found in the body to

account for the heart's unsoundness. But this mere beginning of disease in the arteries, which is indeed a small matter when we see it in single bloodvessels, becomes a great matter, and capable of great effects when it spreads itself throughout the body. It may well be conceived enough to make itself felt by the heart.

In looking over such records of cases as I possess, it is remarkable in how large a proportion of them I find this condition of the arteries coincident with hypertrophy and dilatation of the left ventricle. And this, I have said, may be all that is found in the body to account for the heart's unsoundness. But oftentimes there is this and much more than this. We see that the disease of the arteries has reached a more onward stage, and made larger and more extensive deposits of cartilage and atheroma and bone, while the liver and the spleen and the kidneys are found enlarged and granulated; and the transparent membranes, as the pleura and peritoneum, are thickened and opaque. These are evidences and effects of chronic inflammation, and have a pathological connection one with another. And it is strange, if they have not also a connection with the disease diffused throughout the arteries; and it is strange, moreover, if they have not all a connection with the hypertrophy and dilatation of the heart.

But in speculating upon diseases and disorganizations of other parts as the causes conducive

to diseases and disorganizations of the heart, we must be cautious that we do not invert the real order of things. For the order of causation will be found to run as often from the heart to other organs as from other organs to the heart.

Must we, however, be content to speak of these things as customary coincidences only, or must we try and prove the essential nature of the relation which seems to bind the several organs together in one pathological link, and the heart among the rest? The truth is, we *can* only speak of them as coincidences. We are not sure that we possess a single element towards a proof of the process how they come to pass, and how they are brought together. We want new facts to help us.

And indeed this is the age for finding out new facts, and testing their truth under various aspects. But the time is not come for putting them all in order, and assigning them their right places, and building up systems with them.

The greatest single pathological fact disclosed during the present century, is that which we owe to the research and sagacity of Dr. Bright—the morbid unsoundness of the kidneys attested by the presence of albumen in the urine. It is a fact largely suggestive of things beyond itself, of new elements of disease, and new modes of morbid action. With whatever forms of disease, and in whatever organs of the body, the physician

has to do, he will sometimes meet with this fact in them all. And assuredly wherever he finds it, it holds an important pathological place, though the present state of our knowledge may not enable us to say what that place is.

It is easy to talk disparagingly of the best things. It is easy to talk of this, merely as of one more incurable malady, added to the many which were too well known already. But do we not judge of present diseases, whence they are, what they are, and whither they tend, by the nature of the coincident facts belonging to their clinical history? Now coincident with how many and with what various classes of disease do we not find this momentous fact, this sure index of granulated kidney, albuminous urine?

There are dropsies, and yet at the same time no known impediments of the circulation to satisfy their mechanical theory, or that theory of them which is best understood. But their great coincident fact is albuminous urine.

There are hæmorrhages, bronchial and pulmonary, with sound heart and sound lungs; intestinal hæmorrhages, with sound abdominal viscera. But their great coincident fact is albuminous urine.

There are inflammations of external surfaces, as erysipelas; and of internal surfaces, as peritonitis and pericarditis, arising suddenly, yet without any known sudden impression. But the great

coincident fact is albuminous urine, forming part of their clinical history; and it is strange if it also does not form part of their essential pathology.

To come to particular organs, as the brain: some of its smaller affections will put on a peculiar character of permanency and intractability without further evidence of harm to its own structure; vertigo and pain will be abiding and incurable and incapacitating, while the urine is albuminous. And some of its graver affections will come and go and admit of a present relief, which is unusual when harm has befallen its own structure; convulsions and apoplexies appear and disappear and yet are ultimately fatal, the chief concomitant circumstance which attracts our notice being albuminous urine.

And so too of the heart, it will palpitate without apparent cause inherent in itself; it will undergo organic unsoundness still without cause belonging to itself or to other parts, save what can be inferred from the presence of albuminous urine.

But the kidneys being unsound, and betraying their unsoundness by albuminous urine, what is the common agency by which these multitudinous effects are brought to pass? How does disease befall many organs simultaneously, or how is it handed from organ to organ, from bloodvessels to solid viscera, from the liver and the kidneys to the brain and the heart? Is it through the blood

itself and a poison in the blood? Probably it is. Pathology will perhaps settle the question after the lapse of years. But in the meantime practical medicine must condescend to humbler things, and to seek for causes, if they deserve the name, out of the body. Prior to diseases, to their diagnosis, their history, and their treatment, prior to them and beyond them, there lies a large field for medical observation. It is not enough to begin with their beginning. There are things earlier than their beginning, which deserve to be known. The habits, the necessities, the misfortunes, the vices of men in society contain materials for the inquiry, and for the statistical, systematizing study of physicians, fuller, far fuller of promise for the good of mankind than pathology itself.

There will always, I presume, be a higher degree of certainty, what those things are which entering into the body produce diseases, than either how they produce them, or what the diseases themselves are when they are produced. Finding in particular classes of men predominant modes of living and predominant diseases, and finding the same diseases follow the same modes of living in individuals of all classes, we are more sure that the modes of living produce the diseases, than we probably ever shall, or ever can be, how they do so. We are more sure that the habitual and intemperate use of spirits leads to extensively

diffused deposits of cartilage and atheroma and bone within the arteries, to hæmorrhages from mucous surfaces, to thickening and opacity of serous membranes, to cellular effusions, to granulated kidneys, and to augmented bulk and capacity of the heart, and to a poisoned and corrupted blood; we are more sure, I say, of the *outward* cause, than we ever shall or can be of the inward root, germination, and growth, or of the natural order and sequence of these diseases, by which mankind suffer and perish hopelessly and inevitably.

Our surer knowledge, which regards external causes, is most within our reach. Its fruit is most appreciable and at hand. It concerns the prevention of what is often incurable. It claims an industrious pursuit under a moral obligation, if not from its scientific character. But our more precarious knowledge, which regards internal operations, is what we are most proud of. We learn and we unlearn, and win a truth after the labour of years, and cannot help putting a high price upon it. And indeed it has a scientific value which I will not venture to dispute or to depreciate.

LECTURE XXX.

TREATMENT OF UNSOUNDNESS OF THE HEART IN SOME OF ITS PRINCIPAL FORMS.—TREATMENT OF VALVULAR UNSOUNDNESS.—IN VALVULAR UNSOUNDNESS THE EXPECTATION OF MEDICINE IS NOT TO CURE IT, BUT TO STOP ITS INCREASE, OR TO POSTPONE ITS CONSEQUENCES.—THE NATURE OF THE DISEASE IN WHICH THE VALVULAR UNSOUNDNESS ORIGINATED LIMITS OR ENLARGES THE EXPECTATION.—ALSO THE AGE AND CONSTITUTION OF INDIVIDUAL PATIENTS. — CASES.

HAVING now passed in review the several forms of the heart's unsoundness, whether they proceed simply from disease, or simply from disorganization, or are a complex of both, and having considered their clinical diagnosis, and their clinical history with the conditions prior, preparatory, and conducive to them, whether in the heart or beyond the heart, in the body or without the body, we come better prepared for enquiring into their treatment. We may perhaps already calculate, from the nature of things, the probable expectation of remedies addressed to them; but we must see also what from experience are their actual effects.

Valvular disease of the heart, as far as I at present either know or believe, can only be contemplated in reference to its cure, when it is a

part of endocarditis, and is of the nature of inflammation. Of its treatment as such enough has been said already.

That valvular unsoundness which remains after the subsidence of inflammation, and that which is the result of slow and covert disease, may not be beyond the reach of medical treatment for every purpose, but beyond its reach it certainly is for the purpose of cure.

What medical treatment can do, and what purpose it can answer in such forms of disease, now comes to be considered.

Where the valvular unsoundness is small, and hitherto little or not at all complicated with other disease of the heart, medical treatment has sometimes succeeded in withholding it from *becoming greater*. It has restricted it to what it is, and at the same time prevented or greatly postponed those further structural changes in the same organ, which are naturally liable to follow.

Valvular unsoundness may exist, and there be no extraordinary impulse of the heart within the chest, no habitual disturbance of the circulation, no jerking of the arteries, no congestion of the veins, no hinderance of growth or nutrition to the body at large, no impediment of any function which it belongs to blood or bloodvessels to perform, and no consciousness on the part of the patient, under any circumstances, of the least drawback upon the powers and capacities of health.

The fact of the unsoundness is a secret known only to the physician ; and the single sign denoting it is a loud endocardial murmur.

Or valvular unsoundness may exist, and there be perfect health to *our observation* in every thing besides, yet to the patient's own feeling a certain amount of conscious drawback. He may have learnt, that there is a degree of bodily exertion which he cannot reach without some painful hurry of breathing, and some palpitation of heart. But if he were always careful to keep within that degree, he would never know that he was ill.

The most frequent specimens of valvular unsoundness, existing under these conditions, are found in those who at some past period of their lives have suffered an attack of acute rheumatism in which the heart was affected. And then a great deal is within the reach of prudent management for averting further evil.

The first aim of the physician in such cases should always be to make the patient clearly to understand what his state is, and to see the reasonableness of the advice that is given him. For his treatment, though it may proceed upon our suggestion, must be entirely carried on by himself. It must engage every hour of his life, and be allowed to interfere with all his habits, and conduct, and objects. A man, therefore, had need be well persuaded, that what we require him to do is

right, when the doing it calls for so large an amount of self-sacrifice.

And indeed there are cases in which experience allows us to hope sanguinely, and to promise largely upon the faith of good resolutions, and fair obedience on the part of our patient. For, though he have immoveably fixed within his heart the element of fatal disease, yet upon the condition of strict and habitual temperance, and habitual self-control over body and mind, (no easy condition I allow,) he may count upon living long and not unhappily, and upon postponing to a distant period the evils which threaten his state, or even upon escaping them altogether.

Now there is in these cases a special and peculiar ground of hope; and it is well that we should see and clearly understand what it is. The small amount of valvular injury, and the probability that the heart has hitherto undergone little or no change of structure besides, and the present unembarrassed state of the general circulation, are all favourable conditions. Yet the special ground of hope does not rest here, but upon the fact that the valvular injury had its origin in a certain casual attack of inflammation. The valvular injury from this cause, though it be incurable, does not increase but remains (there is reason to believe) of the same exact amount, be it more or less, at which it was left when the inflammation finally ceased. If it be small, it remains small,

and the evil consequences to which it naturally tends, such as dilatation and hypertrophy, are slow to emerge. If it be large, it remains large, but does not become larger, and its evil consequences emerge more rapidly.

But the amount of valvular unsoundness left by acute rheumatism is not always small. It may be very large. And this is the chief cause of the widely different periods to which men are found to survive the damage thus done to the heart. The valvular unsoundness, according as it is small or great, considered as the germ of future evil, takes a longer or a shorter time to develope its consequences and to bring them to their fatal maturity. Be it, however, small or great, if its evil consequences have not yet arisen, there is always a better chance of postponing them in these, than in other cases where there is the same amount of valvular unsoundness from other causes. That such is the matter of fact I am sure from experience; and, that the reason of the thing is as I have stated, I am pretty confident.

Let us then now turn to the cases of valvular unsoundness from other causes, and consider their treatment with reference to its only possible aim, viz. the postponement of evil consequences which are yet to come.

There are cases in which auscultation finds a loud endocardial murmur constantly present, de-

noting an injury of the aortic or the mitral valve. And this is all we are sure of. There may be, besides, some slight hypertrophy, or some slight dilatation. But at all events the more formidable consequences of valvular injury are not yet apparent, and now is the time and opportunity for their postponement, if indeed they can be postponed. Accordingly we lay down strict injunctions for the patient's habitual management of himself. And this is all we can do. But we do it with little hope of putting off to any distant period the fatal evils to which the valvular injury naturally tends. But why not with the same hope in these as in the former cases? Because in these the origin of the valvular injury cannot be traced back to any certain time, or to any known attack of inflammation, but it has arisen from slow, covert, and imperceptible disease. And, having arisen thus, experience forbids us to reckon upon any long delay of its worst results. And the reason of the thing tells us why.

There are diseases which are covert and imperceptible in their beginnings, and still covert and imperceptible in their progress, until at length they have wrought some palpable disorganization of parts, and thus make discovery of their existence. By the time however they reach this point, the constitution adopts them as a part of itself, and so they can never afterwards cease, but must go on still covertly and imperceptibly augmenting their effects.

Disease of the endocardium is often of this kind. We first know of its existence by the valvular injury which it has already produced. The valvular injury may yet be small, but the disease which produced it is still in progress and still going on to augment it. Our aim is not its cure, but the postponement of its evil consequences. Yet do what we will, we can expect little success, while the original disease is ever at work, and the original unsoundness is ever on the increase.

Further, such disease is seldom restricted to the heart. It is almost always simultaneously going on within the arteries. Hence the injury, which it has already done to the one, is a strong presumption of the like injury done or doing in the other. If, therefore, the valvular unsoundness taken alone be little likely to have its evil consequences postponed, much less likely is this postponement when the valvular unsoundness is combined with depositions of various morbid products largely throughout the arteries.

It appears, then, that valvular unsoundness, itself absolutely incurable, is apt to admit of long postponement, and delay of the evil and fatal consequences to which it tends, when it is in its own nature stationary and unincreasing. And we judge it most likely to be stationary and unincreasing, if its origin can be distinctly traced to some known period and to some certain attack of accidental disease. On the other hand it appears, that valvular unsoundness is apt to admit no such

postponement of its consequences, when it is in its own nature progressive. And we judge it most likely to be progressive, if it be the tardy growth of covert and imperceptible disease.

But neither what we know of the pathology of valvular diseases, nor what we know of their clinical history, will allow us to set up absolute rules of judging what will be their consequences and events in all cases, or how far they can or cannot be postponed.

I have known a few cases in which the fact of detriment done to a valve of the heart has been unquestionable; and I should have expected, from circumstances, a very different event from what actually happened. Their clinical history has not been marked by any known attack of accidental disease which could have come and gone, and injured a valve and left it unrepaired. But the valvular unsoundness has taken place covertly and imperceptibly, and there has seemed to be no reason why the hidden disease, which first formed it, should not still exist and go on continually to augment it. But for years and years it has remained apparently without increase in itself, and certainly without addition of any formidable consequence; and for years and years it has remained harmless, or nearly harmless, and the patients have been entirely unconscious of ailment, or sensible only of some hurry of circulation upon occasions of unusual excitement.

But, besides the circumstances which have been mentioned, there are others belonging to the age and constitution of individual patients, that would reasonably incline us to conjecture differently of the disease which caused the valvular injury, and to look for different results; to hope in one case that the postponement of its evil consequences was possible, and to fear in another case that it was not.

Youth and the aspect of health, and the known habits and enjoyment of health, and the known exemption from hereditary malady would encourage the hope that the disease, (or whatever it was,) which caused the injury, though we knew neither its nature nor the time of its occurrence, was accidental and had already ceased; and that it never extended beyond the compass of its still remaining effect in the valve of the heart. Here we hope indeed more than we know. But this is a rational hope.

On the other hand, advanced life and a cachectic aspect, and the known habits and ailments of intemperance, or some bad hereditary disposition strongly marked, or frequent attacks of some constitutional disorder, such as gout, or rheumatism, or gravel, would hardly suffer us to hope that the disease was single and solitary in the mere valve of the heart which it had injured, (though auscultation did not testify to more,) but would rather lead us to fear its universality in the whole

arterial system. Here indeed we fear more than we know. But this is a rational fear.

I know two young ladies, whom, when I first saw them, one twelve years ago, and the other nine, I did not expect to be alive, and, but for one infirmity, both in perfect health at this day. I was called to see each of them on account of a loud systolic endocardial murmur, which had been just found out accidentally. In both it was audible throughout the præcordial region and far beyond it in front of the chest, and audible also extensively through the arteries. No kind of illness had occurred in either of them to which it could be reasonably imputed.

When the affection of the heart was first discovered, one was a child only four years old. She has now passed her childhood and reached her sixteenth year. In the mean time she has suffered several severe attacks of diffused bronchitis, also hooping-cough and scarlatina anginosa. In the early stages of these diseases the heart's action was most violent and almost tumultuous, and active depletory remedies were employed.

During the last five years her health has been remarkably good. She is very active and fond of exercise. The heart's impulse is easily excited; but this appears to occasion her no distress.

The other was in her tenth year, when the affection of the heart was first discovered. She is now in her nineteenth. In the mean time she

has had scarlatina and measles. On these occasions, and whenever her circulation has been excited by any casual feverishness, she has suffered profuse bleeding from the nose. She too, like the other, is brisk and lively. And the impulse of the heart (I have observed) is raised by moderate exertion; but she is unconscious that it is so.

And now, in one after the lapse of twelve years, and in the other after the lapse of nine, auscultation finds the same condition of the heart which it found at first, and nothing more. In the mean while, no treatment, properly medical, has been employed for either. Both have been the objects of prudent care, but not of irksome restraint.

But who can tell the exact nature of the heart's affection in these two cases? Without doubt there is a valvular imperfection in both. But *disease* may have had nothing to do with producing it in either. It may be a congenital imperfection. The single sign denoting it was indeed found out at a certain time by mere accident. But no one knows how much sooner it might have been found out, had it been sooner sought for. At all events this valvular imperfection, however produced, has been stationary for years and been causing all the while some amount of impediment to the current of blood, but no graver consequences to the heart itself and to the constitution at large have, after the lapse of many years, hitherto resulted.

These cases are full of interesting facts.—Here is a valvular imperfection or injury. It has existed from birth or from very early life. It still exists after many years. All along it has been endured by the heart without any notable change or detriment of its structure, without any painful drawback upon the health, the strength, or the comforts of life; and on the same easy terms it is still endured.

Do not these facts give intimation of a certain *protective* power possibly inherent in the *growing* heart, whereby it can accommodate its form and manner of increase to material accidents and so redress or counteract their evil tendencies?

Now it takes the experience of a vast number of cases to make a man wise enough to pronounce confidently upon the issue of any form of disease. And experience is a thing which we must wait for; we cannot make it for ourselves.

Indeed some forms of disease are so rare, that if all the experience of them which there is in the world were put together and possessed by one man, it would not make him very wise upon the matter.

Physicians however are in a manner often called upon to be wiser than they possibly can be. Disease or imperfection of a vital organ is a fearfully interesting thing to him who suffers it, and he presses to learn all that is known, and often much more than is known about it. He is espe-

cially solicitous to know what will be the result. Thus urged, we sometimes find ourselves giving opinions and prognostics, where our experience would hardly justify us in giving a guess.

What will be the end of the two interesting cases which have been related, I cannot take upon myself to pronounce. For I have no experience of other like cases to guide me. And yet the experience of these cases themselves hitherto seems to contain something of earnest and warning as to the future, something of promise, and something of fear and every thing of practical caution.

That a certain degree of hindrance to the current of blood through the heart should have existed, in one case for nine and in the other for twelve years, without inducing further change of structure in the organ itself, or doing serious detriment to various important functions throughout the body, must encourage the hope that these great evils still admit of long postponement. And the same hope must be strengthened by all we know of the wonderful power of adaptation possessed by the body, during its growth and adolescence, a power, by which it contrives the means of bearing itself harmless and of conserving life. But on the other hand the little it takes in both these cases to rouse the heart to excess of impulse, and the readiness with which inflammation in one, and hæmorrhage in the other, are apt to break out, taking occasion from accidental diseases, are

enough to denote that life is in some jeopardy. They suggest the need of continual watchfulness for averting or mitigating every disease or ailment or casualty, which through the body or the mind can impart a hurtful and hazardous excitement to the circulation.

Let me add the sketch of another case which, as far as it has gone, runs parallel with the two former. Here the valvular injury may have only very recently taken place. At all events it had only very recently been discovered.

A fine rough, robust, healthy-looking school-boy, nine years old, was brought to me two years ago, and my attention directed to an unnatural sound of the heart, which the medical man of the family had accidentally found out about a month before. It was a systolic endocardial murmur, extremely loud, and audible in every part of the chest in front, round to the left axilla, about the left scapula, and especially in the space between it and the spinal column. The murmur was most intense just opposite the sigmoid valves, whence it was propagated along the ascending aorta, subclavian and carotid arteries. The second sound of the heart was a loud snap. There was no undue extent or degree of impulse from the heart, and no undue amount of dulness to percussion in the præcordial region. The boy laughed at the notion, that any thing was the matter with him. He was illustrious among his

schoolfellows for gymnastic feats and all sorts of athletic sports. Climbing and swinging by one arm or one leg with his head downwards were favourite pastimes of his to the very day on which I saw him.

The parents of the boy, aware that something wrong had befallen his heart, naturally enough wished to know much more about it than I could tell them. I told them, however, what I knew of such cases, and made my little experience go as far as it would in the way of encouragement. I told them, in short, of the two young ladies, in whom there had been found years ago the same auscultatory sign, denoting the same sort of affection of the heart as I believed to exist in their own boy, yet who were alive and likely to live at the present day, enjoying a high degree of habitual health, while the affection of the heart remained still the same. I made also my little experience go as far as it would in the way of advice how to manage him. I warned them and the boy himself against such extravagant feats of strength as had been his custom, and recommended that he should come down to something a good deal more moderate in the nature of bodily exercise. And above all I insisted upon great watchfulness whenever he should be ill, especially whenever he should suffer any febrile attack. For I recollected the proneness to inflammation and hæmorrhage in the other two cases.

LECTURE XXXI.

TREATMENT OF HYPERTROPHY OF THE HEART.—
DOUBTS WHETHER IT BE REALLY CURABLE.—COUN-
TERFEIT HYPERTROPHY.—SUPPOSED CASES OF CURE
PROBABLY REFER TO IT.—TRUE HYPERTROPHY.—
ITS TREATMENT CONTEMPLATES SOMETHING SHORT
OF CURE.—BLOODLETTING.—LIMITS OF ITS USE.
—SUCCESS AND FAILURE OF TREATMENT.—CAUSES
OF FAILURE IN CASES APPARENTLY FAVOURABLE.

By most writers upon diseases of the heart I find its hypertrophy spoken of as curable. Its muscular substance having acquired even a large increase of bulk is considered capable of being again brought down to its normal size and normal force of action by medical treatment. And of the remedies contributing to this result I find venæsection represented as the chief. Now it would be unfair to mankind to abridge the hopes and efforts of medical men in all things possible for their benefit; and the cure of hypertrophy of the heart does not look like a thing which is in its nature impossible. But I must confess that, in the whole course of my experience, I never yet met with a single instance in which I was perfectly satisfied that it was cured. This negative experience of mine may not be worth much. Yet

I have been a good deal in the way of such things ; and it does appear rather strange that what others have seen so often I should never have seen at all. Therefore I may be pardoned for suspecting that physicians affirming, not the mere curability of hypertrophy, but its very frequent cure, were under some mistake.

At all events, this is one of the things which yet waits for proof from recorded cases. A late eminent writer* has stated that he had cases which afforded him “reason to believe that nearly the whole, who are under the age of forty, may be radically cured, provided the hypertrophy is exempt from complication with valvular or aortic disease, adhesion of the pericardium, softening of the heart or other organic obstacles to the circulation ; and provided also that the constitution is sound and the general health tolerably good.” But he has given no single specimen of his cases and was content with this general allusion to them.

I am well aware that there is a mock hypertrophy of the heart bearing so close a resemblance to the true that I should find no fault with you for being taken in by the counterfeit.

There may be violent impulse of the heart, felt not only in the præcordial region but in every part of the front of the chest upon which you lay your hand ; and there may be pain in the heart,

* Hope, 289.

and pain and throbbing in the head ; and all these may be never absent and often aggravated from time to time by accidental circumstances ; and they may continue from first to last for several months or for several years, and produce in the mean while an incapacity of all useful exertion both mental and bodily : all these may be, and yet there be no hypertrophy.

Impulse of the heart, taken alone, however great and however extensive it may be, is not a sure physical sign of hypertrophy. Hypertrophy indeed cannot exist without excess of impulse, but excess of impulse can exist without hypertrophy. When the impulse of the heart is excessive, and at the same time its sounds are obtuse, muffled and indistinct, and the præcordial region presents a larger space than natural which is dull to percussion, then the signs of hypertrophy are complete. And hypertrophy so sure and unquestionable was never cured within my experience. But when the impulse of the heart is in excess, and at the same time its sounds are as loud and clear as ever, or louder and clearer still, and the whole præcordial region is quite resonant to percussion save the small space which is naturally dull, then the signs of hypertrophy are incomplete. Yet if this be enough to constitute hypertrophy, I have seen and treated it successfully in a hundred instances. But in the mean time I have

not thought that I had to do with any such affection or ever claimed the least credit for curing it.

Cases of mock hypertrophy of the heart are indeed very numerous. Young persons at the prime of life are especially the subjects of it. They are often plethoric and often sedentary and can assign the origin of their complaint to no particular time and to no particular exciting cause. In them the excessive action of the heart is doubtless owing to a rich and redundant blood; and the cure of their simulated hypertrophy is effected by depletion and abstinence and the gradual exchange of indolent for active habits. These are easy cases to deal with.

Again, young persons are the subjects of it, but they are often pale and thin and dyspeptic and very sensitive, and inactive from mere debility and nervousness. In them the excessive action of the heart cannot be ascribed precisely to any one thing. The stomach and the nerves and the blood itself are all disordered, and they all are sources from which injurious influences may spring up and travel to the heart; and they all have probably their share in producing the simulated hypertrophy. Being so produced, its cure can only be effected by varied methods of treatment and after a long time, and often not until the constitution has undergone some of those changes which belong to stated periods of life. These are by no means easy cases to deal with.

Again young persons are the subjects of it, but they are often neither florid nor pale, neither too full nor too empty of blood. They have no complaint that they can tell you of, and none that you can make out, except an inordinate impulse of the heart; an impulse great enough for any amount of hypertrophy, and constantly present, and admitting of severe aggravation, and ever attended with pain, while the sounds of the heart are still loud and clear, and the præcordial region is still duly resonant.

These cases are the most difficult of all to deal with. Yet their treatment seems theoretically to lie within a narrow compass. There are no ailments of other organs to set right with the hope that through them you may reach the ailment of the heart. The heart itself contains within itself the sole indication of its treatment. Abate its violent impulse and all will be well. But bleeding will not abate it. Neither will all the variety of anodynes and antispasmodics. Neither will digitalis. For digitalis cannot be given long enough and largely enough for any fair hope of it as a remedy, without fearful hazard of it as a poison. In truth I know no certain medicine and no certain plan of medical treatment that will abate this impulse. But still I know that the very worst of these cases may get well. I have seen some such and watched them for a time and then have lost sight of them, and cannot tell how they have

ended. And some I have seen again after the lapse of years, and found them as bad as ever; and some I have found perfectly well. In these last cases then how has the cure been wrought? Why, it has not been wrought in the way, which would imply a gradual process of bringing down an overgrown structure to its natural size and dimensions. But it has been sudden and abrupt, without any strict use of appropriate means, and sometimes with an utter neglect of them.

I remember a most painfully interesting case of this sort in which a strong opinion was expressed by eminent physicians, that the heart was in a state of hypertrophy. With all humility I held and expressed a contrary opinion. The patient was a young man for whom great interest had been used to get a commission in the navy. The commission was at last obtained; and he was ordered to join his ship by a certain day. All his prospects in life were at stake. I fairly represented to his friends, that either he had a most formidable disease, or he had nothing at all. The hazard was run. He joined his ship, sailed immediately for Greece and lost his palpitation at the battle of Navarino.

But there is a treatment of real hypertrophy, which now comes to be considered; a treatment not of cure but of mitigation and postponement, which has for its objects to make the present evils of the disease as tolerable as may be and to avert

or to delay the still greater evils to which it naturally tends.

And bleeding is among the remedies, which we find ourselves called upon frequently to employ for these purposes. But the use of bleeding in hypertrophy is an affair of much more caution and delicacy than you would suppose. I have a general remark or two to make upon this point.

The forcible impulse of the heart and arteries, which characterizes hypertrophy, is far greater than that which ever attends the most acute inflammation. Yet in hypertrophy the quantity of blood which we are commonly content to take is small, and in inflammation the quantity which we are often compelled to take is large. In the case of inflammation the extraordinary impulse of the heart and arteries is the representative of new and extraordinary actions in the whole living frame and is itself a part of them, of an universal strife of blood vessels and nerves, of fever and irritation, which are all engaged, in actuating, sustaining and quickening the local disease. All these must be brought down, before the inflammation can be made to cease; and you can have no assurance that they *are* brought down until you have effectually reduced the extraordinary impulse of the heart and arteries. And a large loss of blood may be needed for that purpose. And when it is needed, there is otherwise no safety for the patient. But in the case of hyper-

trophy the extraordinary impulse of the heart and arteries is no representative of present movements and irritations, febrile and nervous, which are fatally at work in carrying on disease to a destructive event. It depends simply and exclusively upon a mere mechanical force of extraordinary power acting upon the circulation at its source. Therefore it would be in vain to think of altering it by any amount of bloodletting, however large. For the mechanical force, upon which it depends, is itself permanent and unalterable.

But bloodletting is nevertheless a remedy for hypertrophy of the heart. Yet, I repeat, cure is not its object, but the mitigation of present, and the postponement of coming evils. And so it has no stated and constant use against abiding and essential and unalterable symptoms, but an occasional use only against incidental emergencies as they arise; such as pains and spasms of the heart itself, dyspnœa, and coughs, and hæmorrhages, and vertigo, and torpor, and convulsions. It is for these, that bleeding in some mode or measure is frequently needed. It may be venesection. And if so, to what amount? I really cannot tell. Even, if the particular case was now before me, I could not point to any indication which should guide you to take more or less blood. The pulse, I have shown, is no index at all. Therefore I can only say, that the abstraction of a moderate quantity usually answers every purpose of good, and that

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the abstraction of a large quantity incurs great hazard of mischief. If the incidental emergencies are capable at all of relief by venesection, the relief will follow the loss of six or eight ounces at most, and often of much less. Therefore let six or eight ounces be the extreme quantity which is taken by way of experiment in any case, with which you have no previous acquaintance. In cases which you know, the measure of your bleeding to-day must be governed by what has been well borne and has done good heretofore. Experience of the particular case is never so much needed to enable you to do the right thing for incidental emergencies, as in this chronic organic unsoundness of the heart. The loss of a few ounces of blood from the arm, at intervals of some weeks or months, may be the supreme remedy by which you may meet all occasional emergencies, and may be the great safeguard of the patient's life for years.

But venesection at all may be more than is needed. It is so in the majority of instances. Often, very often, have I seen, after a few ounces of blood have been drawn from a vein, and the præcordial anguish and dyspnœa and convulsive cough have been unmitigated in the smallest degree, that half a dozen leeches have swept them all away at once.

It deserves to be mentioned indeed, as a thing beyond all reasonable calculation, that a few

leeches should be thus able to overpower the most tumultuous conflict of pain and dyspnœa and nervous alarm, which can be conceived. Yet they do effect all this so often and so completely, that I am accustomed to resort to them, in these perilous emergencies of hypertrophy of the heart, before any other method of taking blood. Unquestionably they succeed oftener in bringing relief than either venesection or cupping.

In the long course of such an affection as hypertrophy of the heart, things to be feared, as well as things which actually occur, have their due weight in determining us both what to do, and what to abstain from doing.

Now anæmia is an awful condition when it is added to hypertrophy of the heart, in whatever way it arises. And it may arise in the natural course of things slowly and gradually, from a defect or failure of the digestive and assimilative powers. Or it may arise abruptly and suddenly from over bleeding. And no sooner does it take place, than the extreme evils of the disease rush in upon the patient at once, and life runs rapidly down to its close.

One might fancy, that in hypertrophy the very condition of the circulation was such, as would enable it to bear with impunity the withdrawal of the largest amount of its natural stimulus. One might fancy, that the heart's indomitable force of action would prevent or mitigate the evils

of an impoverished and scanty blood. But it is not so. With the anæmia all the cellular structure and every internal cavity have been filled with serum in a few days. Or with the anæmia no serum has been effused, but the heart has beat more forcibly than ever, and the patient has been literally agonized and killed by the mere violence of its impulse.

The palpitation which springs from anæmia, when the heart is sound, how dreadful it sometimes is! The pain, the jar, and distraction of the brain seem too great to be borne. Yet they commonly are borne, and they cease at last, and the patient gets well. But much more dreadful is the palpitation which springs from anæmia, when the heart is in a state of hypertrophy. Then the pain, the jar, and distraction of the brain are multiplied tenfold and are intolerable. Delirium and convulsions arise, and death soon follows; while neither blood nor serum has escaped from the blood vessels, which could be considered as the immediate cause of death.

Beware then, in the management of hypertrophy of the heart, beware above all things, of bleeding your patients into paleness and poverty of blood.

But in hypertrophy of the heart there are other methods of compassing all possible ends within the reach of medical treatment, besides venesection and cupping and leeches. In many

a case no bleeding whatever has been employed from first to last, and yet all the relief and mitigation, that could be fairly expected, have been obtained. These other methods, however, have their application to other forms of disorganization and to their pathological consequences, as well as to hypertrophy, and therefore they will be more conveniently considered in another place.

You might think perhaps that this hypertrophy of the heart, which is independent of valvular injury, provided it have not reached an extreme degree, would be a very manageable affection; manageable (I mean) not as to its cure, but as to the mitigation and postponement of evils belonging to it. Yet what is the fact? Why, that the best treatment in cases, which give (as far as we see) the fairest promise of success, is very apt to fail.

In some cases indeed no further evils arise, than such as from necessity must be where hypertrophy exists. For years there is still no mischief apparent except in the heart. And this makes no progress. It spins upon itself and evolves nothing beyond itself, neither dropsy nor hæmorrhage nor any of those secondary diseases of lungs, or brain, or liver, which are its looked-for consequences. — But these cases are the few.

In other cases, and these not the few, hypertrophy is hardly known to exist, or is thought to be yet at its commencement, when its ultimate evils

begin prematurely to show themselves. Dropsies, congestions and hæmorrhages; cerebral, pulmonary and hepatic disorders arise and increase and admit of little mitigation, and death arrives far sooner than, regarding the heart as the chief and sole centre of mischief, we should have thought possible.

But after death dissection discloses the secret why our remedies have failed, and why the ultimate evils (as they seemed) of hypertrophy of the heart were so speedy to appear, and so unmitigable and so rapidly fatal. In truth the dropsies, the congestions, or the hæmorrhages, or the diseases, functional or structural, of brain, lungs, or liver were not, as they seemed, the effects solely of the hypertrophied heart. But these and the hypertrophied heart itself were secondary to something, which preceded them all, and was the cause of them all, viz., disease pervading the whole arterial system. The internal lining of the arteries, to their third and fourth ramifications and even their minuter branches is found puckered and shrivelled and roughened with deposits of atheroma and cartilage and earthy matter.

By such disease their elasticity is destroyed, or their natural calibre is altered; and this is especially observable in the aorta, which has sometimes undergone abrupt contractions or large dilatations between its origin and its arch or somewhere in its course through the chest.

In the records of my early hospital practice I find numerous instances, in which a *moderate* hypertrophy was the only apparent cause of numerous accompanying conditions of disease. And yet it seemed hardly capable of producing them. But still this hypertrophy and these its supposed consequences would admit of no mitigation and postponement. Death took place, and *that* was then disclosed, which in these days would not escape detection during life, viz. granular disease of the kidneys.

What exact relation such disease of the kidneys bears to hypertrophy of the heart, we do not know even yet. But the two are too often coincident in the same subjects for them not to bear some, and that a very important, relation to each other.

LECTURE XXXII.

TREATMENT OF ATROPHY OF THE HEART—OF SOFTENING—OF DILATATION.—MEASURE OF ITS EXPECTED BENEFIT IN EACH.

ATROPHY of the heart, or attenuation of its muscular substance, is the form of disease which is naturally opposed to hypertrophy. Now of this atrophy, I doubt whether it can ever be made a distinct object of medical treatment *relative to cure*. I doubt whether the heart, having suffered such loss of substance from special disease of its own, can ever be made to recover it again by help of medicine.

When owing to defect of nourishment, from fever, or from disease in particular organs, or from accident, the whole body becomes weak and attenuated, the heart may perhaps (I am not sure of the fact), share the general disorder and become weak and attenuated also. And when the whole body, owing to better nourishment, becomes robust and lusty again, the heart may perhaps (I am not sure that it does) recover its natural strength and substance.

But all this, although it may originally spring from disease, yet, as far as the heart is concerned,

has to do, not with disease, but with degrees of health. The full energies of health decline, and the heart suffers; the full energies of health revive and the heart is re-invigorated.

As to attenuation of the heart, when it is a special disease of the organ itself, I cannot flatter myself that I ever cured it even in its simplest form. The complex form in which it commonly appears may be safely pronounced incurable. The heart which is attenuated is commonly softened, and the heart which is attenuated and softened has commonly one, or both, of its ventricles dilated.

Softening of the heart may be looked upon as reparable or irreparable according to the conditions which have preceded it and conduced to it, and which still accompany it.

We will first consider it as a reparable disease.

There is a softening of the heart, which belongs to fevers of a typhoid type, when the whole mass of blood becomes loose and black and incoagulable, as if some foreign ingredient or some new force had operated upon it so as to change its chemical affinities and destroy for the time its natural properties as blood. Now this softening is reparable, though it is not always repaired.

When in fevers the skin becomes dusky, and the impulse of the heart fails and fails, until it can be *felt* no more; and the systolic sound of the heart fails and fails until it can be *heard* no more;

and death follows, and after death the heart is found to yield and fall in pieces under pressure of the fingers; then surely we cannot be wrong in ascribing to the softened heart a large share in procuring the fatal result.

Again in fevers when the skin is dusky, and the impulse and systolic sound of the heart both fail, and death is imminent and threatening, and yet under the seasonable use of wine and stimulants the skin brightens and the heart is again felt and heard, and with its returning impulse and sound all inauspicious symptoms are gradually cleared up and recovery is finally complete, then surely we cannot be wrong in believing, first that the heart had been softened, and had afterwards recovered its natural texture and power, and secondly, that this recovery of its natural texture and power was mainly instrumental in saving life.

This softening of the heart in fevers is no new fact. But the knowledge of the precise auscultatory signs which denote its softening, and of the precise auscultatory signs which denote its recovery, this indeed is new knowledge, and we owe it to Dr. Stokes of Dublin. And further the detection, in these same auscultatory signs of one precise and plain *indication* to guide us in a most difficult point of medical practice, viz., the administration of stimulants in fever, this too is new, and this too we owe to the same sagacious

physician. Whoever discovers a single new indication of treatment, which shall prove just and true and comprehensive, does a better service to mankind than if he found out twenty new remedies.

From what I have seen I am convinced, that this softening of the heart, by corruption of the blood in fevers, is often a very rapid process and never a very slow one. And I am also convinced that the recovery of the heart (when it does recover), by restitution of the blood, is often a very rapid process and never a very slow one. The blood is soon changed *from* its healthy state, and soon changed back again *to* it. The process seems more chemical than vital from its mere rapidity.

Now, as to treatment, it should seem that whatever had power to restore its healthy quality to the blood would be the remedy most suitable to recover the heart from its softened condition; and theoretically one would look to chemistry for it. But chemistry has no such remedy to offer us; and so we are left to make the best of our mere experience and to sustain the nervous system and the movements of the heart by simple stimulation, while nature transacts the business of reparation in her own way. Our remedies have no other purpose, and probably have no other effect, than to keep up a little life until the blood is able spontaneously to restore itself, and

by consequence to restore the heart, and whatever other organs may have suffered the like detriment with it, to the conditions of health.

There is also a softening of the heart, which belongs to certain diseases of a chronic kind characterized by an unhealthy state of the blood; such as scurvy and chlorotic anæmia. When people die of scurvy the muscular structure of various organs throughout the body is found loose and soddened and without its natural cohesion, and of the heart among the rest. And when they die of chlorotic anæmia, internal parts are not only found as bloodless as the surface, but also loose of texture. Such is the condition of muscles, and among the rest of the heart.

But recovery is infinitely the more frequent event of these diseases; even full and complete recovery, when it is impossible to doubt that the heart and whatever other parts have suffered detriment are restored to their natural integrity.

Now in these cases the softened heart has no special remedy. Its treatment is merged in the treatment of the scurvy or the anæmia. Cure the one by lemon juice and the other by steel, and you cannot help but cure the softened heart.

Be it remembered, that the softening of the heart, which belongs either to fever, or to scurvy, or to chlorotic anæmia, is part only of a great constitutional disease, and that it partakes of the

same nature and admits the same influences for good or for evil, and the same means of cure.

This then is a sure fact of pathology, and very important to know, that the heart, whether its softened state has been of very short duration as in fevers, or of very long duration as in scurvy and anæmia, is capable of regaining the original firmness and consistence of its healthy structure, when the fever or scurvy or anæmia is past.

But though this be possible in the nature of things, is it commonly the actual event? Indeed I believe it is. Yet it is otherwise stated in books; where the softening of the heart begun in fevers is looked upon (I find) as likely ever afterwards to remain and to terminate in the worst pathological consequences. That this has happened, I must admit. For one or two such cases have been reported to me upon authority which I can entirely trust. But I have no record of any case in my possession, and I have no remembrance of any, where a chronic disease of the heart, which had softening for its main characteristic, could be fairly traced back to a certain period, when the patient suffered fever.

So too the softening of the heart begun in scurvy and anæmia is spoken of (I find) as apt to be permanent and lead to fatal results. Now I have no right to be absolutely incredulous about the possibility of things which I have never seen. Nor am I. Yet I may well doubt their *frequent*

occurrence, when, being both in the way of them and upon the look-out for them, I have never yet met with them at all.

From what I have seen I suspect it to be an indispensable condition to the possibility of cure in these cases that the disease of the heart should be a simple softening of its muscular structure and nothing more.

But we have now to consider the softening of the heart as an irreparable disease. Yet as such it is still the same disease anatomically, but another disease in all its pathological relations; and hence it comes to be irreparable.

When it is a part of fever or of scurvy or of anæmia, *its* treatment is merged in *their* treatment, and *it* is reparable because *they* are reparable.

In the majority of cases, however, softening of the heart is not found coincident in its origin either with these, or with any other constitutional maladies of a like character, namely, with such as have a stated course to run, or are spontaneously curable, or curable by help of medicine. But it is secret in its beginning and secret still in its stages and periods, until at last we find it one among many diseases of other parts which have been as covert in their origin and growth as itself. Of it and of them it is now in vain to enquire which preceded and which followed; and, looking upon them

pathologically, we cannot tell whether to reckon each as several or all as one disease.

The patients are in the decline of life, or they have forestalled the season of old age by intemperate habits. Their nervous system may be shattered: their arteries may have undergone extensive changes of structure: their livers may be enlarged, their kidneys may be granulated. All of these forms of disease may be, and some of them are sure to be, conjoined with softening of the heart, before it comes to be known and to be treated.

And, further, before it comes to be known and to be treated, the softening of the heart is already a part only of a complex disease in the organ itself. The very same tissue, the muscular tissue, has undergone other disorganization besides softening. Either it is augmented in bulk and hypertrophied, or it is diminished in bulk and attenuated. This chronic softening of the heart is (as far as I know) always united either with hypertrophy or attenuation.

Further, a heart softened and hypertrophied, or a heart softened and attenuated, has (as far as I know) always one or both of its ventricles dilated.

Thus this chronic softening is a part of a three-fold disorganization of the heart. And, if each part separately offers (as it does) but a slender hope of cure, the complex of the three may be set down as incurable. No bark or steel or tonic remedy

can now reach the heart and strengthen it. No mercury or iodine or alterative remedy can now reach the heart and change it to its natural state again.

Is dilatation of the heart *per se* a reparable disease? We are encouraged to believe that it is upon good authority. But I can really find no satisfactory evidence of the fact. I even doubt whether there be any such thing as a dilatation of the heart, *per se*; whether either ventricle ever have a *constantly* enlarged capacity while its walls are of a perfectly normal and healthy structure.

No doubt there is a temporary yielding of the ventricles in obedience to a temporary necessity. This is seen especially on the right side of the heart, when blood is detained within it from obstruction to its passage through the lungs; but as soon as the pulmonary circulation is set free, the heart, being no longer surcharged with blood, returns upon itself and the ventricle resumes its normal capacity. But this is *distention*, not dilatation. And it is for the very purpose of enabling it to bear this distention and to recover from it, that the heart is endowed with its great physical property of *elasticity*.

Now I understand this to be the distinction between distention and dilatation. The capacity of the ventricle may be indeed augmented equally in both; but in the one the elastic property of the heart remains, and is ready to bring back its

capacity to what it was and what it ought to be, when the extraordinary pressure from within shall cease; while in the other the elastic property is lost, and so the power is wanting to bring back its capacity to what it was and what it ought to be.

But how is this elastic property lost? Is it not because the muscular structure in which it resides has lost its perfect organization? When the heart is dilated, it is (I believe) always at the same time either hypertrophied or attenuated or softened. And it is dilated, *because* it is hypertrophied or attenuated or softened.

Dilatation, then, can never in itself become the sole or direct object of medical treatment, inasmuch as it has no manner of existence except incidentally to certain conditions of the solid structure which bounds the cavities of the heart. You cannot reach it remedially but through them. You can cure a dilatation of the heart only by first curing an hypertrophy, an attenuation, or a softening of heart. How far these are curable we have already considered.

Thus I have taken several of the most important diseases of the heart which pathology has described and distinguished by names, and have endeavoured to estimate, under the guidance of such experience as I possess, how far, either singly or in their more accustomed combinations, they are amenable to medical treatment. And the result is, that in my belief a too flattering

representation has been made by writers of what medicine is able to effect respective to *their cure*.

Physicians do well to follow in the track of the pathologist. Our *treatment* of disease should strive to keep pace, if it can, with our *knowledge* of disease: but we must not be disappointed, when it cannot. In a hundred instances we must be content to know what is wrong without being able to set it right.

But diseases should not be too hastily pronounced irremediable. We have indeed much knowledge from experience, but not a complete knowledge, of what is remediable and what is not, in all cases.

Diseases are irremediable in two senses; either nature wants the power, or we want the remedy. The essential work, or operative process of reparation, belongs to nature. Medicine only furnishes inducements or removes impediments. Failure may be on the part of one or the other, or of both.

Now after a certain amount of detriment done to an organ by disease, we are as sure from experience, that restoration to its integrity of structure is impossible, employ what remedy we will, as we are that an amputated limb will never grow again.

Again, there are diseases, in which we are sure on the one hand that reparation is within the power of nature; yet we are sure on the other

that, without the seasonable aid of medicine there will be no reparation in fact. Such are acute inflammations.

Again, there are diseases, in which there is no settled opinion among physicians either as to the power of nature to effect their reparation or the power of medicine to further it. Such are hypertrophy, and atrophy and softening and dilatation of the heart. Nor ought this to excite surprise. The diseases themselves are of very difficult investigation, and so are all points, both pathological and practical, connected with them. No wonder then, that upon the great point of their curability medical men, whose experience is equal, should come to different conclusions according as their minds are wont to be satisfied with greater or less degrees of evidence, or their tempers are more or less sanguine, or their opinions apt to be more or less indulgent to their wishes.

But medicine contemplates other objects besides cure. It aims still to postpone the progress of incurable disease and to put off its evil consequences; and, when they can be no longer postponed, it seeks to render them more tolerable.

When the heart has become a spoiled organ, it is still a vital organ. Unsound as it is, all parts of the body still draw the pabulum of their life and their functions from it. But their life and their functions partake henceforward of the heart's imperfections.

There is a mischief done to the heart which cannot be undone, and an unsound heart cannot be made to do the office of a sound one. But the unsound heart with even its imperfect office, being essential to life, must yet have our care to avert from it all possible obstacles and hindrances, in order that it may not entirely fail. But with this view other organs and systems of organs demand our attention more than the heart itself in its own proper seat. Medicine is called upon to give aid and support to every feeble and failing function throughout the body, and so to prolong a precarious existence by lightening the burden of the heart. But this opens to us a new field of enquiry.

LECTURE XXXIII.

EFFECTS OF AN UNSOUND HEART UPON THE GENERAL VASCULAR SYSTEM, ACCORDING TO ITS DIFFERENT FORMS OF UNSOUNDNESS. — EFFECTS UPON THE VEINS. — EFFECTS UPON THE ARTERIES.

THUS far in one sense the heart has been taken as the centre of disease. The actuating causes having their origin elsewhere, have been followed in their bent and tendency *towards* the heart, and the disease itself has been sought and found and treated *in* the heart.

But now the heart is to be taken as the centre of disease in another sense, namely as its point of departure. The movement of the actuating causes is to be followed in an opposite direction, proceeding *from* the heart instead of tending *towards* it, and the disease itself is to be sought and found and treated in other parts.

Intermediate between the heart and all structures and organs throughout the body, and carrying the pabulum of life through a thousand channels, is the vascular system; carrying life, and healthy life, as far as it depends upon the

heart, when the heart is sound, and still carrying life but unhealthy life, when the heart is unsound.

From the unsound heart a fountain of evil is opened which reaches to all parts, and actual disease may be ultimately induced upon all. But the intermediate vascular system may be expected to give tokens antecedently, in the way of preparation, of what is going to take place. What sort of preparation this is, which is carried on within the veins and arteries, for diseases to be developed anywhere or everywhere, becomes an interesting enquiry.

To begin with the veins. The plainest and most palpable effects of an unsound heart upon the circulation in the veins are denoted by their distended and overloaded state; and not by their distended and overloaded state only, but their visible pulsation and quivering. The first denotes an impediment to the transmission of blood onwards, the latter denotes its regurgitation backwards.

Simple distention of the veins is often visible in every part of the body. Pulsation or quivering seldom reaches beyond the jugulars; but I have seen it extend as far as the large superficial veins of the hands and feet. The jugular veins, when their pulsation is constant and very evident, have generally undergone some change in their natural capacity. They stand out from the neck like

large round cords, equal almost in size to the little finger. When their motion is a mere quivering and is not constantly present, they do not always appear larger than natural.

To come at the real origin of any symptom, it is necessary to ascertain what is the simplest form of disease with which it is apt to be associated. Now I had found the symptom in question, viz. the distended and pulsating jugular vein, associated with such various and complex forms of unsoundness in the heart, that for a long time I had no notion to which of them it expressly belonged; I had observed it with hypertrophy and attenuation, with dilatation of the various cavities, and with stricture at the various orifices. At length I met with it, where the right auricle and ventricle were dilated while every other part of the organ preserved its natural structure and capacity. This, as far as I know, is the simplest form of unsoundness of the heart with which it is ever associated. This, therefore, I must believe to be its real efficient cause. And from this it may still derive its origin, even when it is found associated with more complex disorganization of the heart, of which dilatation of the right auricle and ventricle forms only a part.

Now one effect of dilatation of the right auricle and ventricle obviously must be, that the aperture of communication between them should become wider, and that the valvular apparatus, which

naturally does no more than close it, should now be rendered inadequate to the purpose. Hence, every time the ventricle contracts, blood is impelled backwards as well as forwards. And the veins near the heart easily admit its regurgitation.

But still one has seen a pulsation, a temporary pulsation, at least, of the jugular veins, under circumstances where it could not be supposed that the right side of the heart was otherwise than sound of structure. In a severe paroxysm of asthma, one has seen it; and both have ceased together.

Yet how can there be even a temporary pulsation of the jugular veins, implying the regurgitation of blood within them, while the right side of the heart is sound and the tricuspid valve is healthy and capable of fulfilling its supposed functions?

Subsequent experiment has, I believe, confirmed the important fact which was first pointed out by Mr. Hunter, viz. that the valves on the right side of the heart do not, in their healthy state, perform the office of barriers to the regurgitation of blood as perfectly as those on the left. If the pulmonary artery be injected towards the heart, the semilunar valve does not entirely prevent the injection from passing into the right ventricle; if the right ventricle be injected towards the auricle, the tricuspid valve does not

altogether exclude it from the vena cava and the jugular veins.*

Now upon reflection it must appear, that this natural attribute (for such it is) of the valves on the right side of the heart, whereby in truth they fall short of the perfection of valves, not only serves to mitigate the urgency of disease, but is an admirable provision coming into frequent exercise in health, and absolutely required to prevent the gravest injuries and even to guard the continuance of life itself.

The whole blood of the body must needs pass through the lungs, where it is liable to suffer impediments daily and hourly. Perfect respiration is necessary to perfect freedom of the pulmonary circulation. But to how many checks and hindrances is the respiration obnoxious, among other causes, from great bodily exertion, from efforts of voice, and from many mental emotions? And all such checks and hindrances are felt by the pulmonary circulation according to their degree; and then nature is called upon to bring into play her own express provision for withholding for a time from the lungs that portion of blood which they cannot bear, and (if need be) for throwing it back upon the veins. Unquestionably one part of this provision is the apparatus at the entrance of the pulmonary artery and between the right ventricle and auricle. It is even its imper-

* Hunter on the Vascular System, cap. vii.

fection, considered as valves and compared in its office as such with the apparatus holding the same relative situations on the left side of the heart, but its admirable perfection in its own office and use, which gives this wondrous aptitude to sustain, correct and compensate the accidental checks and hindrances of the pulmonary circulation.

If the valves on the right side of the heart were, like those on the left, absolute and unyielding barriers to the return of blood, we must die of every exertion or accident which could impede the respiration even for a short time. If the blood must be forced forwards instantly and constantly, column by column, as it arrives at the heart, the bloodvessels of the lungs must be instantly and constantly ready to receive it; otherwise they must suffer rupture, and let loose a flood within them producing death by pulmonary apoplexy. But nature has been provident in guarding against such fatal necessities. The vessels of the lungs cannot indeed at all times receive the same quantity of blood, for they are not at all times equally free. Hence a provision was necessary and a provision was made, which, inaccommodation to their varying capacities, allows some portion of the blood to linger in the right side of the heart, and, if need be, to fall back into the veins, until the lungs recover their ability to transmit the whole.

There is then an extraordinary mode of action, which the right side of the heart in its *healthy* state is capable of exercising for the regurgitation of blood into the veins. And this regurgitation may be enough to produce distention and visible pulsation of those nearest the heart. But the pulsation of the jugular veins so produced is merely temporary, and must be carefully distinguished from that which is permanent. For it is the permanent, which is the symptom of an unsound heart. The heart, having its right cavities largely dilated, cannot help producing permanently that distention and pulsation of the jugular veins, which it produces temporarily only and by an extraordinary mode of action in its state of health.

The same case in the course of its progress is sometimes found to exemplify both of these conditions. A man is the subject of asthma; and in the severer paroxysms of his disorder the jugular veins are observed to stand out and to pulsate, but, as soon as the attack is over, they subside and resume their natural state. Thus far the right side of the heart, its structure being unimpaired, admits the regurgitation of blood for the relief of the lungs as long as it is needed and no longer. In process of time his asthmatic paroxysms become more frequent, and strange to say, in the intervals between them the jugular veins do not subside and cease to pulsate. There

may indeed be some degree of constant dyspnœa; but the venous distention and pulsation are greater than the apparent impediment to the passage of blood through the lungs can explain. They are greater now that they have become permanent, than ever they were during the severest asthmatic paroxysms. In truth the heart has undergone that change of structure which an asthmatic state of the lungs is calculated to produce. Its right cavities are permanently dilated and have produced permanent distention and pulsation of the jugular veins, as a natural and necessary consequence.

Further, in regard to this state of the jugular veins, it is worthy of notice that it is apt to arise at different periods of time in different cases, and that, taken as a symptom of an unsound heart, it is apt to bear not always the same relation to its other symptoms. It often shows itself at an early period and is prominent from first to last. And again it often shows itself late and is superadded to other unequivocal symptoms which have already long existed. Herein it exhibits a striking correspondence with the peculiar change of structure from which it takes its origin. For dilatation of the right cavities is often the heart's sole or principal form of disorganization from first to last; and again it is often consequential to other forms of disorganization which preceded it.

Where distention and pulsation of the jugular veins have been among the earliest symptoms,

and have continued constant and prominent to the end, it may be inferred that the disorganization began on the right side of the heart. Where they have been among the later symptoms, it may be inferred that the disorganization began in some other part of the heart and subsequently reached the right side. And the eventual appearance of distention and pulsation in the veins may then be taken to mark the period at which the right auricle and ventricle became dilated.

Thus, from conditions apparent in the largest and nearest veins to the heart, we can measure the degrees of impediment raised by the heart's unsoundness to its returning blood. And experience has learnt to which form of unsoundness the greatest impediment belongs.

But the veins nearest the heart are a part only of the entire venous system, the larger channels into which smaller ones without number empty themselves. The larger therefore cannot be obstructed and the smaller remain free. And so it is that when the jugular veins are full and pulsating, the whole surface of the body becomes dusky and the lips and eyelids livid and swollen.

Such is the influence of an unsound heart upon the circulation of blood in the veins, and such is the particular form of unsoundness, which makes itself especially felt in this part of the vascular system.

Here, then, behold the preparation within the

veins for diseases afterwards to be developed anywhere or everywhere, of what nature it is, and how it is carried on. Hence come congestions, effusions, hæmorrhages, inflammations.

Let us now turn to the arteries.

The plainest and most palpable effects of an unsound heart upon the circulation in the arteries are denoted by their excessive, or by their defective, or by their irregular, impulse. Not that each of these may not consist with the heart's perfect freedom from organic injury. The sound heart is subject to hurtful influences out of itself; and these influences it often feels and obeys and resents as if the injury were all its own, sound as it is. Its contractions may have much more or much less than their natural force, or they may lose their natural rhythm; and so the pulse become very strong, or very feeble, or very irregular.

But then the strong or the feeble or the irregular pulse need not be (experience tells us) of any formidable account, as long as the heart is sound. It may come and go, or it may continue long or continue always, and yet have no present or prospective evils beyond itself naturally and necessarily belonging to it. But with the excessive or defective or irregular impulse of the arteries, when it proceeds from an abiding unsoundness of the heart, it is far otherwise. Then it is always the prelude or accompaniment of some deeper and

more vital derangements of the entire arterial circulation.

It is needless here to stop and discuss the signs, which are to determine when an abnormal motion of the arteries is derived from unsoundness of the heart, and when it is not. The diagnosis lies in a small compass and is seldom difficult. It turns altogether upon auscultation, when we apply it to the heart, finding something, or finding nothing, organically wrong there. But something organically wrong being found, its nature and its seat next require to be learnt, for the sake of better understanding how the derangements of the arterial circulation have arisen out of it, and how they are kept up by it from day to day, and to what they ultimately tend; and all this for the sake also of better understanding how they are to be treated.

Now as to its seat; in order to make itself felt first and especially in the arteries, the heart's unsoundness must be of the left side. And as to its nature; when the impulse of the arteries is permanently greater than natural, it must proceed from some form of unsoundness which gives the heart *a real excess* of organic power; and not only so, but which induces and actuates it to be constantly using this excess of power which it has. Such is hypertrophy of the left ventricle. And when the impulse of the arteries is permanently less than natural, it must proceed from some form

of unsoundness which entails upon the heart *a real defect* of organic power and constantly keeps down its actions to this small measure of power which it possesses. Such is softening and such is attenuation. And when the impulse of the arteries is irregular, it must proceed either from some form of unsoundness which entails upon the heart a simple defect of organic power, or from some which raises a mechanical impediment to the current of blood. It must come either from softening or attenuation. Or it must come from valvular injury.

These, I am well aware, are not axioms; and I do not pretend to affirm them as such. But they are facts so far generally true, as to contain something of a principle, which may be of use in our further consideration of the subject.

Well, then, an overstrong heart produces an overstrong pulse, and a weak heart produces a weak pulse; and a weak heart or a heart mechanically obstructed produces an irregular pulse. These things are easily stated, and in themselves are hardly worth dwelling upon. But the deeper and more vital derangements of the arterial circulation, which accompany them, are of chief concern to us as physicians.

While the left ventricle preserves its natural size and structure, it distributes its blood to all parts with a force and in a quantity proportionate to their several needs. It holds a salutary and

independent dominion over all, and yet allows to the extreme bloodvessels of each part their independent uses and functions.

But the left ventricle in a state of hypertrophy impels its blood to all parts with a force and in a quantity greater than they can bear. It now becomes an overmatch for the circulation. It does not so much preside as tyrannise over it. Its power is painfully present everywhere. It pushes the globules further into the extreme branches than they would naturally reach, and so reddens surfaces which are naturally pale; and to parts, which are naturally red, as muscle, it imparts a more conspicuous redness. It encroaches upon the independent functions of the capillaries until finally it abolishes them. Hence congestions and dropsies and hæmorrhages, and diseases, of whatever name and whatever part, which result from repletion of the bloodvessels and effusion of their contents.

Again, the left ventricle in a state of attenuation or softening impels its blood to all parts with a less force and in a less quantity than they need. It can now hardly be said to preside over the circulation. Hardly is its power sensibly present anywhere. The blood, which leaves it, seems to make its own way, as it can, by an unequal and ill-sustained current throughout the body. And so parts become pale and dusky and mottled and cold for want of the due measure of blood within

them or for want of sufficient vital briskness in its course. Hence there result diseases of the same name at least as those which come from hypertrophy, though not entirely of the same nature. Passive, instead of active, congestions and effusions; passive, instead of active, hæmorrhages and inflammations.

Again, valvular injury, while it renders the pulse irregular, delays and obstructs the course of the blood through the arteries in various measures according to *its* degree. And then these delays and obstructions according to *their* degrees bring a greater and greater hindrance, until finally they put a stop and a stand to all that blood and blood-vessels have to do with the functions of particular organs. And thus the ultimate effects of valvular injury are the same with those of hypertrophy, and those of softening and attenuation; viz. congestions and effusions, hæmorrhages and inflammations.

Here then is a sketch of what unsoundness of the left side of the heart, according to its several forms, is calculated to bring upon the arterial circulation and, through it, upon the constitution at large. And it is, I believe, a true sketch, as far as it goes. For just as simple and as plain, as it is here represented, is the matter *sometimes* found to be in practice. And it is well to begin with what is simplest and plainest.

It is *sometimes* (I say) found to be so; but

neither always nor very often ; nor, when it is so, is it found so to continue very long. Therefore, if I were to leave the matter here, unsoundness of the heart and its effects, immediate and remote, would seem, from my representation, a much simpler and plainer piece of pathology than it really is.

But in the first place, these several forms of unsoundness belonging to the left side of the heart, need not occur singly and separately. Nor do they ; neither hypertrophy alone, or attenuation alone, or softening alone, or valvular injury alone, as if one naturally excluded another. On the contrary, they are almost all capable of entering into combinations with one another, and are continually found together. Hypertrophy indeed cannot co-exist with attenuation ; for the same thing cannot at once be thick and thin. But hypertrophy is compatible with softening, and softening with attenuation, and valvular injury is compatible with them all, and, accordingly as far as they are all compatible, so far they often coexist. In fact, they naturally grow up together, or they naturally induce one another, and thus, except during the actual progress of acute disease or the earliest stages of chronic, it is a rare thing to find the unsoundness of the heart limited to one particular structure or to one particular form.

But do not these strange mixtures of disease produce strange mixtures of symptoms ? And

are not the modes, in which especially the arterial circulation is effected, so complicated as to defy the possibility of reducing them to any definite order? And is not an extreme difficulty thus thrown in the way of our present purpose; the purpose, namely, of gaining an insight into the operations then at work throughout the body, which are preparatory to diseases of fatal tendency yet to come?

Now the results of experience carefully considered will show, I think, that there is in fact less perplexity belonging to the matter, than would at first sight appear.

Two forms of unsoundness, which are themselves different in kind, may produce the same effect upon the circulation. And when such forms are combined, there is found indeed a complex disease of the heart: yet an effect upon the circulation proceeds from both, altogether as simple and entirely of one kind as when each form exists alone, only greater in degree.

Attenuation of the left ventricle is one form of unsoundness, and softening of the left ventricle is another. Attenuation produces feebleness of the pulse, and softening does the same. And when they occur together, their combination serves but to give the pulse a greater feebleness and to bring on those deeper derangements of the arterial circulation, which are common to

both, sooner, and to impress them with a more decided character.

Here then there are no discordant results to reconcile. Two causes are found operating in the same direction; and the effect of one is simply multiplied by the effect of the other.

Again, there are several forms of unsoundness in the heart, which may be said rather *to tend towards* a certain effect upon the arterial circulation than necessarily to produce it. They must reach a certain amount before the effect is sure to follow. Yet where each separately would not be enough to produce it, from [their combination it would arise inevitably. Attenuation of the left ventricle, softening of the left ventricle, injury of the valves either at its entrance or its exit, all tend to interrupt its rhythmical action and to make the pulse irregular. But the heart does not lose its rhythm and the pulse its regularity from every attenuation, or from every softening of the ventricle, or from every injury of the mitral or aortic valve. The attenuation or the softening or the valvular injury must be extreme for either of them singly to produce this effect upon the heart and arteries. But the combination of all three, though each were but of small amount, would produce it inevitably.

Here, too, there are no discordant results to reconcile.

In speaking of distinct forms of unsoundness in

the heart, and in endeavouring to appreciate their separate influence upon the arterial circulation, we passed by all mention of dilatation of the left ventricle.

The truth is, that experience hardly recognises it as a distinct form of unsoundness, and can take no sure measure of the separate influence which belongs to it. But there is no form with which it is not found in alliance, and the part which it then acts in combination, is not difficult to interpret.

Whether the left ventricle gain or lose in muscular substance or gain or lose in muscular consistence, it is apt at the same time to acquire an augmentation of its capacity. Now when this is the case, what effect upon the circulation within the arteries can be attributed to the dilatation beyond what would result from the hypertrophy alone, or from the attenuation alone or the softening alone, in the several cases? I believe nothing different in *kind* but something different in *degree*, whether of more or less. Dilatation further augments the impulse of an hypertrophied heart, which is already excessive. And dilatation further diminishes the impulse of an attenuated or a softened heart, which is already defective.

When the impulse of the heart is thus augmented both in proportion to its hypertrophy and in proportion to its dilatation, and each is great in degree, results of *one* kind are indeed fearfully

displayed. The hypertrophied heart, constantly receiving a larger quantity of blood into a more capacious ventricle, constantly feels a greater stimulus, and, being ever ready with full power to answer it, it *does* answer it by a never-failing, even by a terrible reaction. Throwing forth more blood and moving it column by column with a stronger current, it fills and distends the arteries even to the peril of rupture and overflow, and hurries on all its fatal consequences to an earlier and surer consummation.

Again, when the impulse of the heart is diminished both in proportion to its attenuation or its softening, and in proportion to its dilatation, and both are great in degree, results of *another* kind follow, and bear a very marked and exaggerated character. The attenuated or softened heart receiving a larger quantity of blood into a more capacious ventricle may feel a greater stimulus, but it certainly has not the power to answer it; and answer it it does not by any adequate reaction. It conveys not more but less blood into the arteries. It cannot cast forth what it contains. And what remains behind, remains to stagnate and regurgitate, distending the heart and baffling its motions, oppressing the lungs and baffling the respiration or bringing their vital functions to a sudden stop.

But two forms of unsoundness in the heart, which are themselves different in kind, may pro-

duce different effects upon the arterial circulation. And, when they co-exist in the same heart, one would expect to find partly one effect and partly another, and that thus a complication of opposites would result, which would be quite unintelligible. Yet this need not be the case. One effect may be taken up by, and merged and lost, in the other; and, while the unsoundness of the heart is of two kinds, it may be felt by the arterial circulation as if it were of one kind and one only.

Hypertrophy of the left ventricle gives an extreme force, and softening of the left ventricle an extreme feebleness, to the pulse. But the hypertrophied structure may become softened, and the two conditions of hypertrophy and softening afterwards subsist together. Yet there is no mixture of the effects of each upon the circulation. The extreme force, which belongs to the one, gives place to the extreme feebleness which belongs to the other; and all the other deeper and more vital derangements of the circulation will thenceforth change their character, and be altogether as if no hypertrophy existed in the heart but softening alone.

When softening is thus superadded to hypertrophy, and when the effects characteristic of the first supersede the effects characteristic of the second, then the change which the patient experiences is upon the whole greatly, very greatly, for the worse. The change of strength

for weakness is always for the worse. But the mixture of these two forms of unsoundness in the heart does, I believe, seldom occur. And hardly ever, when it does occur, is it clearly made out during the life of the patient. Indeed how is it possible that it should, when an entire order of symptoms, which should indicate one part of the complex affection, the hypertrophy, is utterly abolished?

There is however a mixture of two forms of unsoundness in the heart, which is very common. All physicians of hospitals are familiar with it from having examples of it constantly under their observation. It is the mixture of hypertrophy and valvular injury. Here the diagnostic signs of both remain, so that there can never be the least doubt of the existence of either. The impulse within the chest, constantly augmented in degree and in extent, denotes the hypertrophy. The endocardial murmur, constantly present, denotes the injury of the valves.

But, while the coincidence of the two is thus far without prejudice to the diagnostic signs of either, yet looking further to the actions of the heart itself, to the movements of the blood within the arteries, and to the deeper and more vital derangements, which naturally belong to each when they exist separately, we clearly discern the effects of the one wonderfully merged and lost in the effects of the other, now that they exist in com-

bination; we see the effects of valvular injury merged and lost in those of hypertrophy.

To valvular injury naturally belong an irregular contraction of the ventricle and an irregular pulse, and obstructions and delays to the course of blood through the arteries in various measures according to its degree. To hypertrophy naturally belong an excessive force of contraction in the ventricle and an excessive impulse communicated to the current of blood in the arteries. And this force and impulse are naturally opposed to all that is irregular and eccentric in the action of the heart and arteries, and even counteractive of it, when it would otherwise arise. Thus they are counteractive of their irregular action, when it otherwise would arise from valvular injury.

Moreover this coincidence of hypertrophy of the left ventricle and of an injured valve exhibits the most beautiful example, in the whole range of pathology, of the checking, redressing, and compensating powers which nature possesses and uses in furtherance of the great ends of mitigating distress and of protracting life, when some important structure is damaged beyond the possibility of reparation.

In this coincidence there is nothing of accident; all is of design. The important structure, damaged beyond the possibility of reparation, is the valve. The unsoundness of the valve comes

first, and then produces the hypertrophy, and produces with it the redress of its own injuries. While the valvular unsoundness is yet small, and still when it has become greater, and even still when it has become very great, the heart is often found from first to last maintaining its rhythm and the pulse its regularity. And no wonder. For it is accompanied at every stage of its increase by a proportionally increasing power of the ventricle.

A loud systolic endocardial murmur and an excessive impulse of the heart and a larger space of præcordial dulness than natural, these are the sure and authentic signs of an injured valve and hypertrophy of the left ventricle. Yet often and often are these found to co-exist, when the order and sequence of the heart's contractions and the beats of the pulse are perfectly regular and rhythmical. And further, with this certain evidence of an injured valve and of hypertrophy of the left ventricle, not only will the heart and the pulse beat regularly, but the blood will continue to be distributed freely and equably throughout the body. Often the complexion is still healthy, the lips florid and the body well nourished.

Here it is the hypertrophy, which is the safety of the patient and enables life to go on as it does. Take away the hypertrophy and leave the injured valve, and the patient would be in a far worse state than he now is; worse with half his disease

than he now is with the whole of it. The pulse would begin to flutter, the complexion would become dusky and the lips blue, and the surface of the body mottled and patched in consequence of the blood being here and there unequally distributed or partially detained. The ventricle reduced to its common bulk would want the power needed to impel the blood steadily onwards against an extraordinary obstacle.

But let nothing that has been said be misinterpreted. Hypertrophy of the left ventricle is still a tremendous evil. Recollect its immediate effects upon the arterial circulation, which are preparatory to others more formidable and more fatal, ready to be developed in due season. And valvular injury too is still a tremendous evil. Recollect also its immediate and ultimate effects, which are alike formidable and fatal. True it is, that in the coincidence of the two, one is found to fulfil a salutary office respective to the other. But this is only for a time. The valvular injury and the mechanical impediment annexed to it may increase beyond the possibility of deriving relief from any compensating power whatever. And the hypertrophy too may so increase that the salutary office, which might belong to it in its lesser degree, is exchanged for an unmitigated and deadly mischief.

LECTURE XXXIV.

GENERAL VIEW OF THE SECONDARY DISEASES WHICH PROCEED FROM AN UNSOUND HEART, AND OF THEIR TREATMENT.—THEIR VAST PATHOLOGICAL RANGE.—CONGESTIONS.—EFFUSIONS.—HÆMORRHAGES.—INFLAMMATIONS.—INQUIRY INTO THE COMMON PRINCIPLE OF THEIR CURABILITY.—CURABLE IN A HIGHER AND A LOWER SENSE ACCORDING TO THE NATURE OF THEIR ACTUATING CAUSE.—AS THE RESULT OF AN UNSOUND HEART CURABLE ONLY IN A LOWER SENSE.—SUSPENSION.—ABATEMENT.—TEMPORARY REMOVAL POSSIBLE.—CONDITIONS LIMITING AND ENLARGING THE EXPECTATIONS OF MEDICINE IN DIFFERENT CASES.—FORM OF UNSOUNDNESS IN THE HEART ITSELF.—PRESENCE OR ABSENCE OF COINCIDENT DISEASE IN OTHER ORGANS.—THE NATURAL CONSTITUTION OF THE PATIENT, WHETHER HEALTHY, OR PLETHORIC, OR ANEMIC.—THE PATIENT'S CONDITION IN LIFE.—THE TIME AT WHICH TREATMENT IS FIRST INSTITUTED.

CONGESTION, effusion, hæmorrhage, inflammation are terms used to express the elementary forms of disease which belong especially to blood and bloodvessels, and which, taken in all their bearings, comprise a very large portion of the entire domain of pathology and practice; a portion which has ever engaged the study of the best minds, since medicine began to be cultivated as a science.

What these forms of disease are essentially in themselves, and how blood and bloodvessels are engaged in producing them, also what are the preceding conditions which can be reasonably thought to stand to them in the relation of causes, whether predisposing or exciting, near or remote, within or without the body; upon all these important matters I must presume, that some sound knowledge is already possessed. For I cannot now enter upon them with a view to their explanation.

Only I would remark that, of the multitude of such matters worth knowing, there are some which are practically more desirable to be known. It is especially desirable, with a view to the best treatment of these diseases and with a view to the best results to be expected from their treatment, that we should be able, from among various preceding conditions, to choose and fix upon those which possess the real force of *actuating* causes in each particular case. For many causes may concur to produce one of them. Or a single cause may produce them all, together or in turn. And that single cause may be an unsound heart. Congestions and effusions and hæmorrhages and inflammations, in any or every part of the body, may be reckoned among the ultimate consequences of an unsound heart. Now the fact of their having an unsound heart for their actuating cause does not put them beyond the reach of medical

treatment. Very far from it. But it assigns certain limits to what is to be expected from medicine. Our present object is to inquire what those limits are.

But first a little thought may be well bestowed upon the general subject of their curability under whatever circumstances they occur. Every one knows with what uncertainty they are found amenable to medicine, now easily, now scarcely, and now not at all; and it would be well, if we could, to come to some right notion, what it is that makes them so.

Our remedies, or (to speak more to the purpose) our methods of treatment for these affections, are chosen according to the objects we have in view. The affections themselves and their actuating causes may be both within our reach, and therefore both within our view in treating them. And then we seek a treatment which will compass both. We aim to get rid of present disease and to leave nothing in the constitution from which it can germinate afresh. This is cure in the highest sense. Or only the affections themselves may be within our reach, and their actuating causes may be beyond it. And then we seek a treatment which shall concern itself with the one, and stop short of all interference with the other. The best we aim at is to get rid of present disease, while we leave the patient just as likely to suffer it again at some future time, as he was at first.

This, if it may be called cure at all, is cure in a much lower sense.

From malaria, from contagion, from absorbed poison, from heat and cold, from moist and dry, from bodily and mental exhaustion comes fever, when all the bloodvessels suffer some sort of disturbance and the whole blood some sort of corruption. And from the bloodvessels thus suddenly disturbed and the blood thus suddenly corrupted, as from their actuating causes, may come rapid congestions or effusions or hæmorrhages or inflammations. Here the actuating cause is so closely followed by its result, that the two are almost coincident. Our treatment hardly discriminates between them. It comprehends both and seeks to counteract both simultaneously. And its success, if it succeed, is speedy and complete. And its failure, if it fail, is speedy and complete in like manner. Patients are quickly rescued or they quickly die.

It is in the fevers of intertropical climates, that these phenomena are most conspicuously displayed as well as the power of medicine in controlling them.

Again, from too little food and defective nutrition, from too much food and excessive nutrition, from noxious food and vicious nutrition; also from simple defectiveness of the digestive and assimilative functions, arise a deteriorated blood and a morbid action of the bloodvessels. And these, as actuating causes, may bring about

congestions, or effusions or hæmorrhages or inflammations *slowly* and after the *lapse of time*. Here the actuating cause has had long precedence of the result. Our treatment easily discriminates between them. It comprehends both, but it ministers to each separately. And its success and its failure are always lingering and wait to be ratified by long trial. Patients are slow to recover and slow to die.

Cases of disease are everywhere and every day occurring, which, taken in their origin, their course, their character, their events and in the conditions of their cure, and viewed comprehensively, are specimens of all that is here meant. For diseases may bear diverse names according to the parts and organs which they occupy, and still have a kindred nature and acknowledge a common origin. Visceral fulness and enlargements, œdema of the extremities, bronchial defluxions, and diarrhæa, hæmatemesis and melæna, purpureous spots and scorbutic patches and various cutaneous eruptions, are so many specimens of congestive, dropsical, hæmorrhagic and inflammatory disease. They are to be directly ministered to and kept in check, and cured, it may be, for the present, by their appropriate remedies. And their kindred nature often makes them amenable to such remedies as have a similar mode of operation. But this check or this cure, which they receive, is sure to be temporary only, unless the treatment be

made moreover to reach far back to preceding conditions which are their actuating causes; unless, by medicine and by regimen, which have an alterative and tonic power, its healthy quality be restored to the blood and their healthy action to the bloodvessels.

But again there are actuating causes, which are different in their nature from all these and which yet have to do with blood and bloodvessels and which produce the same results, even congestions and effusions and hæmorrhages and inflammations. Some single attack of acute disease may, after it has ceased, leave a damage behind it in the part it occupied, which can never afterwards be repaired. Or some slow disease may have long lain covert, and only at last give notice of its existence by an incurable mischief which it has done. Thus alterations of form and substance, thus degenerate structures and foreign growths arise in any and every part of the body. And then the function of the part, whatever it be, determines the nature of the injury that results to the health of the individual. If it be the heart, forthwith a disturbance is brought upon the mechanical forces, which move the blood. The blood being unduly accelerated or retarded, arrested or regurgitated, gives occasion to congestions or effusions or hæmorrhages or inflammations.

Here then observe how, in the nature of things, a much narrower sphere is left for the operation

of medicine. Medicine is still concerned with the same diseases. But all preceding conditions, which stand in the relation of actuating causes to present results, are placed beyond its reach. With their results and with them alone it is left to deal, as best it may.

These few general remarks upon so large a subject as the treatment of the most important and most frequent forms of disease, which proceed from blood and bloodvessels, will not (I trust) be thought superfluous. I want to find the principle of their curability when they *are* cured, that we may be able to distinguish the cases which fall within it, from those which lie beyond it, and so may come better prepared to our present subject of inquiry.

The principle of their curability then is this, that their treatment should be able to include within its remedial power and agency not themselves only but also their actuating causes. Their suspension, their abatement, even their temporary removal may be possible, although the actuating cause still remains. But then they are ever ready to begin again. This therefore is no perfect cure. Perfect cure looks to the removal both of themselves and of their actuating causes. It does not indeed contemplate that, after their removal, they shall never return. But it *does* contemplate that, before they can begin again, their actuating cause will have to begin again also.

Such is the principle of their curability in the *highest sense*. And if so, it is plain that the congestions, effusions, hæmorrhages and inflammations, which spring from an unsound heart can never fall within it. If such be their cure and nothing less, cured they never can be perfectly.

Nevertheless their suspension, their abatement and even their temporary removal may be considered within the possible reach of medicine. The fact of their having an unsound heart for their actuating cause assigns these as the general limits of what is to be expected from their treatment.

Their suspension, their abatement or their temporary removal is the extreme of what is possible. But how much of what is possible can be deemed probable in any particular case, the circumstances of that case must tell.

There are many forms of unsoundness belonging to the heart. You know what they are; valvular injury, hypertrophy, attenuation, softening, dilatation. And though some of these may have the benefit of a doubt, whether they be absolutely irremediable or not, yet by the time they have produced any of the secondary diseases in question, they must surely have gone too far to admit the possibility of a perfect cure.

Now one might suppose that the mere incurability of the unsound heart, whatever might be the form of its unsoundness, would assign an ex-

act limit to the influence of remedies upon the secondary diseases, which spring from it, and that this limit would be the same in every case. But such is not the fact. The incurability of the unsound heart only determines these secondary diseases not to be curable in the highest sense. What is likely to be the effect of medicine upon them short of perfect cure, that the *particular form* of unsoundness is concerned in deciding.

Simple hypertrophy of the heart allows a freer use of medical means in dealing with its pathological consequences, and permits a fairer hope of the fullest measure of relief which is possible, whether it be of their suspension, of their abatement or of their temporary removal, than does either its attenuation or its softening. Where there is an increase of structural organic power, there are many remedies with which we can interfere from time to time and for a long time together, to put restraint upon the excess of action which naturally results from it. But where there is loss of structural organic power, the remedies are few, if any, by which we can make up for the defect of action which naturally results from it. We can go nearer to reduce a strong heart to the level of a weak one, than we can to raise a weak heart to the level of a strong one. As an ingredient of disease and an object of treatment strength is always more manageable than weakness. And, as with the heart itself so with its effects; conges-

tions and effusions and hæmorrhages and inflammations admit many more remedies, and remedies of much more power and efficacy, when the pulse is strong, steady, and rhythmical, than when it is feeble, fluttering, and irregular.

But there is more to be taken into account than the particular form of unsoundness belonging to the heart, when we wish to measure the probable effects of medicine upon these its ultimate pathological consequences. And it is this; that the unsoundness of the heart is apt to be complicated with organic diseases of other parts, diseases equally capable with itself of producing the same pathological results.

If I except those cases, in which the damage done to the heart could be clearly traced back to some distinct attack of accidental disease, such as rheumatic inflammation, my records of dissections (and they have been pretty numerous) do not supply me with a single instance of a person reputed to die of disorganized heart and its consequences, in whom after death other parts also were not found disorganized, such as the liver, the kidneys, serous and mucous membranes, and above all, and more frequently than all the rest, the whole arterial system. And the kind of disease in other parts has been such as could have in no wise been derived from the heart; but it must have grown out of special morbid processes within themselves, whether prior or sub-

sequent to, or simultaneous with, the disease of the heart.

When, therefore, there is dropsy and with it an unsound heart, you must not be too sure that the unsound heart has been altogether instrumental in producing it. The heart may have only had its share, and its share may have been a small one. When there is dropsy and with it that particular form of unsoundness in the heart, which allows the freest use of medicine for its relief, simple hypertrophy, you must not be too sure that it will be actually relieved; for this hypertrophy is apt to be combined with extensive disease of the arterial system.

But there is more than the unsoundness of the heart itself, however well ascertained in its form and character, and there is more than the super-added unsoundness of other organs, either known or suspected, to be looked to, when we are concerned with the secondary diseases in question. The quality of the very blood which the unsound heart is circulating, now becomes a potent contingency, and may hasten or postpone, may increase or extenuate, all the evils which flow from it; and may modify their treatment and hinder or aid the operation of remedies for their relief.

The general mind of the profession is just now all alive in quest of the elements of disease in the blood. A good deal is in a hopeful way of investigation, and some little is already made out.

But let us beware of the common fault of physicians in all ages, and not make too much of our new knowledge and call upon it prematurely to explain every thing. Thus much, however, we cannot help seeing plainly enough, that the opposite states of plethora and anæmia have a vast pathological import both in themselves and in relation to all diseases, come from what source they may. They have it unquestionably, and they display it in relation to those secondary diseases which spring from an unsound heart.

Plethora belongs essentially to the blood, and results from one of its elements, the globules, being in excess. Now think of what plethora is in its effects; how it modifies the functions of health, how it directly conduces to certain kinds of diseases, and how it stamps a peculiar character upon all.

Think of great habitual force of the heart's action and great habitual fulness of the pulse; of blood carrying with it its visible colour of blood much further into the capillaries than natural; of rapid digestion and rapid nutrition, great consciousness of strength and vitality, and great muscular development. Such is the health of the plethoric.

Think of frequent vertigo and ringing in the ears, and frequent drowsiness; of spontaneous congestions and spontaneous hæmorrhages and feverish heat on slight provocations. Such are the proper ailments of the plethoric.

And think of every accidental injury and every accidental disease, whatever part of the body it may befall, being apt to put on the character of inflammation and to demand bloodletting. Such is the peculiar character which they have in the plethoric.

Now plethora, if it be indeed the thing it is here said to be, calls for continual watching and management and discipline to preserve that health which is ever bordering upon disease. And it is well when, without any conspiring circumstances beyond itself, a bare plethora is withheld from being consummated in congestion or effusion or hæmorrhage or inflammation. But when the heart is unsound and perhaps the bloodvessels too, and perhaps many a solid structure besides, plethora means something much more formidable.

Take that form of unsoundness of the heart, which is in itself the least incompatible with the continuance of life, and which is the most easily withheld from becoming worse and whose evil consequences are the most easily postponed, simple hypertrophy of small degree. This simple hypertrophy, when the blood which the heart circulates is plethoric blood, becomes conditionally a worse disease. It is more sure to augment itself and more sure to hurry on rapidly to its worst events. The heart feels an intolerable stimulus and resents it powerfully.

Take other forms of unsoundness, such as greatly

diminish the organic power of the heart, or such as put positive mechanical obstacles in the way of the circulation, attenuation, softening, great valvular injury. Then the plethoric blood, instead of being a stimulus, becomes a burden to the heart; a burden which it can hardly bear and hardly move. Then all the face, the neck, and the lips are purple with blood, and the jugular veins stand out, and there is an agonising dyspnœa, and we look for sudden death by cerebral or pulmonary congestion or hæmorrhage.

Again, anæmia belongs essentially to the blood, and results from one of its elements, the globules, being in defect. Consider what anæmia is in its effects; how it, like plethora, modifies the functions of health but in a different way; how it too conduces to certain kinds of diseases, and how it stamps a peculiar character upon all.

Habitual feebleness and frequency and occasional irregularity of the heart's action, habitual smallness of the pulse, the blood failing to give its colour to the skin and to the visible portions of the mucous surface; slow and painful digestion, defective nutrition, cold extremities, nervous depression, mental irresolution, such are the ingredients which go to make up the health of the anæmic at best.

Throbbing in the head, and vertigo and ringing in the ears as frequent as in the plethoric, and pain more frequent and more acute; also spon-

taneous hæmorrhage as in the plethoric, but now taking the shape of purpureous spots and blotches; and œdema of the ankles and feet, these are the proper ailments of the anæmic.

Then every accidental form of injury and disease putting on the character of weakness; inflammation itself failing to accomplish the proper work of inflammation for want of power, and not bearing the remedies of inflammation, yet still continuing pertinaciously, and often refusing to be cured; such is the character they have in the anæmic.

Now anæmia, bare anæmia, is a thing formidable enough in itself. Without disease or injury of any solid structure whatever, the essential disorder of the blood alone may kill. It may give occasion to passive effusions, and to passive hæmorrhages, and to passive inflammation, which bring on death.

As in plethora, so in anæmia, each unsoundness of the heart becomes conditionally a worse disease, but worse in a different way. As in plethora so in anæmia each unsoundness tends more rapidly to its evil consequences, but those consequences are apt to emerge in a different manner. Passive effusions, hæmorrhages, and inflammations are rather wont to appear everywhere than in certain parts. Death seldom now arrives by oppression of the brain or the lungs singly, but oftener by oppression of many organs simultaneously.

But there is yet another consideration which should be taken into account, when we are calculating the probability of such success as is possible in treating the secondary diseases, which spring from an unsound heart. What I am now going to allude to has nothing to do with any intrinsic pathology. It comes not from within the body, yet does it exercise a vast influence upon all that is going on within. Neither is it age or sex or temper or temperament. These things indeed have their weight ; though we need not be over curious (as we sometimes are) in putting them in the balance. We may safely trust common sense to take them and weigh them and allow for them as it pleases. But the consideration I allude to is simply this, whether the patient be bound or not, by the necessity of his being, to live by the sweat of his brow.

One part of mankind can take care of their bodies all their life long. They need never use them but for recreation. Another part cannot take care of them for a single day. They must be always using them and toiling with them and living by them. Yet, as long as health lasts, they that can live at ease, if they will, have no very sure advantage over those that must labour, whether they will or not. But, when disease comes, their advantage is plain enough ; especially, if that disease affect a vital organ, and, most especially, if it affect the heart.

Whatever form of unsoundness belong to the heart, the patient's own instinct is continually telling him that he must be still. For want of this needful quiet the heart makes quicker progress in all its changes of structure and quicker accumulation of their disastrous consequences. It is sooner hypertrophied, sooner attenuated, sooner dilated, and the disturbed blood-vessels sooner betake themselves to congestions and effusions and hæmorrhages and inflammations. And then, for want of the same needful quiet, the hopes of medical treatment are oftener disappointed. Neither their suspension nor their abatement nor their temporary removal can now be promised upon any calculation of what the mere state of the disease would render probable. Hundreds of people die many years sooner than their mere disease would bring them to an end. Their disease would still let them live, but their adverse fortune kills them.

There remains yet one more important circumstance, extrinsic though it be, which claims to be noticed. If ever time and opportunity come in to turn the balance of success in favour of medical treatment, it is when we are concerned with the secondary diseases which proceed from an unsound heart.

A disease, which by its own nature is placed fairly within the power of medicine, may by the loss of opportunity escape far beyond it. This is

most strikingly shown in acute disease but it is *most frequently* shown in chronic. Acute disease is never more severely felt than on its first access; consequently it is then, that it most importunes our aid and most commonly obtains it. But if it do not then obtain it; if from the unfortunate condition of the patient the opportunity then be lost, all is lost.

Chronic disease, on the contrary, is often not felt at all in its beginnings and often little felt in its further progress, and only at last decidedly felt when its effects have so accumulated as to oppress and overbear the functions of particular organs. And then, and often not till then, it first importunes the aid of medicine, when the time is past for counteracting the actions and sufferings which are *the disease*, and nothing is now left but to render *its effects* more tolerable. Here the opportunity, which may be lost by the covertness of the disease, should be saved by the watchfulness of the physician.

But our concern at present is not with original and primary diseases whether acute or chronic, not with diseases engendered anew in a sound body, which nothing might lead us to expect; but with secondary diseases springing from an unsoundness already known, which we are ever on the watch for. Detection therefore is much easier, if the patient be within reach.

Here however is the perplexity, every man,

who has an unsound heart, had need to be always under the eye of a physician; and then we, knowing what to expect, should be likely to discern its evil consequences on their first appearance and institute our treatment at the time most favourable to its success. But this can seldom be the case. Yet what a vast difference does it make, whether our treatment commence as soon as a slight crepitation is heard in a small portion of one lung, or be delayed until it has pervaded a large portion of both, or until one side of the chest is entirely dull to percussion. Or whether it commence with the first noticeable œdema of the ankles, or it tarry until serum be let loose into the entire cellular structure of the body and into the cavities of the chest and the abdomen.

I would presume to note it for a predominant fault of systematic writers, that they are apt to take it for granted, that we are always called to treat diseases just at the right time. This is not dealing fairly with us.

Finally, of all that has been stated this is the sum; —

1st. That the fact of congestions or effusions or hæmorrhages or inflammations having their actuating cause in an unsound heart prohibits the possibility of their cure in *the highest sense*, and limits the expectations of medicine to their suspension, their abatement or their temporary removal.

2dly. That the form of unsoundness in the heart furnishes a measure of calculation, how much medicine will probably be able to effect in the individual case, whether it will go to suspend or to abate or even so far as to abolish them for a time.

3dly. That the presence or absence of coincident disease in other organs always modifies those expectations of relief by medicine, which the mere form of unsoundness in the heart itself would lead us to entertain.

4thly. That constitutional plethora and anæmia are grave contingences when they are found in coincidence with an unsound heart, having an important bearing upon its consequences and upon our modes of treating them and upon our expectations of giving relief.

5thly. That, besides all these intrinsic conditions, the extrinsic accident of what may be the patient's circumstances in life throws a great weight into the balance for or against the probability of relief. The man, who, having an unsound heart, must traffic with his sinews, for his daily bread, has a poor chance of benefit from medicine.

6thly. That treatment has never more need of being favoured by opportunity than it has now.

Having thus formally stated the conditions intrinsic and extrinsic, which, being co-incident

with an unsound heart, give a character to its secondary diseases and place them more or less within the reach of medical treatment, I shall venture to refer to them hereafter, without further explanation, as I may have occasion, when I come to speak expressly of these diseases and their management.

LECTURE XXXV.

PARTICULAR VIEW OF THE SECONDARY DISEASES WHICH PROCEED FROM AN UNSOUND HEART, NOT LIMITED TO ANY CERTAIN PART OF THE BODY.—THE LUNGS THEIR MOST FREQUENT SEAT.—THE LUNGS, THEREFORE, THE CHIEF SCOPE OF MEDICAL TREATMENT. — THEIR NATURE WITHIN THE LUNGS. — THEIR MODE OF TREATMENT AND MEASURE OF CURABILITY GREATLY INFLUENCED BY THE FORM OF UNSOUNDNESS WITHIN THE HEART.—SECONDARY DISEASES OF THE BRAIN — OF THE LIVER.

WHEN medicine is to be brought to operate upon the secondary diseases proceeding from blood and blood-vessels, which are the result of an unsound heart, we now understand what are the limits of its possible success, and we understand too what are the contingencies which may interpose to aid or to hinder our treatment.

But, after all, enough remains in the power of medicine to make us study the choice of its means and to keep a careful watch upon the opportunities of using them. Possible suspension and abatement and removal, though it be but for a time, are no small things, when they are spoken of diseases, which become inevitably fatal by their continuance or their increase.

But where in the body are these formidable

affections, the results and concomitants of an unsound heart, apt to appear? Both within and without, both deep-seated and on the surface, sometimes plain to be seen and sometimes to be searched after before they are found.—Many a man having an unsound heart has been killed before his time by an internal congestion or effusion, which has gone undetected and unministered to.

Cases of the following kind are not unfamiliar to me. A man has hypertrophy of the heart in a moderate degree with some small amount of valvular injury or with none at all. Hitherto he has been tolerably free from painful palpitation and dyspnœa except under excitement or extraordinary exertion. But suddenly he is found gasping and struggling for breath and expecting instant dissolution. What is this; and what is to be done? Truly one might be excused for thinking of angina pectoris or some spasm of the heart, and flying to ammonia and æther and opium for relief. But putting my ear upon the chest I have found a small crepitation diffused through the half of one lung, or in the half of one lung I have been unable to catch any audible murmur whatever either natural or morbid. A single cupping upon the chest, just opposite the portion of the lung that labours, has swept away the crepitation, or has removed the dulness and brought back the respiratory murmur; and the patient has been restored in a day or two to his ordinary state of

comfort. Here in one instance there has been sudden and extensive effusion into the extreme bronchial ramifications or vesicular structure of the lung, and in another there has been sudden and extensive congestion.

Such cases as these are very striking. All that belongs to the disease and all that belongs to the remedy is so clear, so marked and unequivocal; pulmonary congestion and effusion suddenly coming on and life brought into instant peril; and then, with the use of the proper remedy, congestion and effusion suddenly gone and life restored to safety.

These are specimens of what is apt to occur in cases of unsound heart; full-sized and full-drawn indeed, yet withal true specimens; and so the fittest to learn by. The same things in kind, but drawn in a less distinct and smaller character, are seen every day.

The lungs in short are the most frequent seat of the congestions and effusions, hæmorrhages and inflammations, which are the results and concomitants of an unsound heart; and the lungs are the chief scope of medical treatment from time to time in many cases, and even the sole scope from first to last in some cases, of unsound heart. For, besides the general reasons, which, when the heart is unsound, render the lungs obnoxious, in common with all parts of the body, to these affections and which are to be found in the obstructed state

of the circulation, there are moreover special reasons which render them obnoxious to the same in a greater degree, and which are to be found in the close relationship and mutual dependency of function subsisting between these two organs.

If we analyse carefully the numerous processes of which any complicated disease consists, it is remarkable how many of them we shall find among the means and contrivances, to which nature resorts for defending, for prolonging, and, it may be, for rescuing the life of the individual; and how many symptoms which, as involved in these processes, we call symptoms of disease, we might rather regard as signs of the curative purpose, which nature is striving to accomplish.

All this is less apparent in the primary morbid action of a part and its direct symptoms. But it is both apparent and manifestly true in the secondary morbid processes arising in other parts and in the symptoms which designate them. Let us take for example the secondary morbid processes going on within the lungs, when the heart is unsound.

Nature does, as it were, make use of the lungs as the readiest and the nearest channel through which to relieve the oppression of the heart. The area of every bronchus and its ramifications afford altogether an immense extent of mucous surface; and nature calls sometimes upon a part and sometimes upon the whole of it to relieve the heart and the circulation in their embarrassment; and some-

times she requires an augmentation merely of its natural secretions and sometimes a separation of pure blood.

It is remarkable for how long a time the lungs are often patient of this extraordinary use, which nature makes of them, without detriment to their structure. For, to whatever extent the mucous membrane may be affected and in whichever way, whether it separate mucus or blood, whether there be an expectoration of phlegm merely or hæmoptysis, the air is often found passing through every part of the lungs within reach and cognizance of the ear; and indicating by sounds here and there and everywhere the fluid it meets with as it passes, and that it does not pass uninterruptedly.

Now this profuse mucous expectoration or hæmoptysis is capable of being suspended or abated or removed for a while. The unsoundness of the heart, by the time these pulmonary symptoms have arisen is commonly beyond the possibility of cure. Yet the numberless miseries contingent upon it are *not* beyond the possibility of great relief and mitigation, which we shall best succeed in procuring, if we keep our minds attentive to the processes which nature is carrying on within the lungs, and to the symptoms which bespeak what they are. For they are not only significant of the way in which nature is attempting her own relief, but significant also of the manner in which we should attempt to succour her.

Thus for months and months together and even for years, we may keep people alive and give them incalculable comfort by aiding the lungs in the office of relief, which they are striving to perform, to an unsound heart. This is done by drawing blood from, or by producing vesication or counter-irritation on, the walls of the chest, just when and where and to the extent that may be required. We should endeavour to make out from time to time, by careful auscultation, what parts of the lungs chiefly labour, where they chiefly crepitate or where they are becoming dull, and to the surface of the chest immediately opposite those parts apply our remedies. Thus by taking a few ounces of blood by cupping or leeches, or by applying a blister or a mustard poultice on the *right* spot and at the *right* time, we shall often obtain a degree of relief for our patient, which nothing but experience could lead us to expect. And we shall obtain the like relief in the same case again and again, always provided we take the same care to choose the right spot and the right time in the application of our remedies to the walls of the chest. And what is the secret of our success? The secret (I believe) is this. We are aiding nature in the very channels through which she is seeking to obtain succour for herself. Therefore our remedies are the more effectual.

It would be difficult to overrate the value, as

guides to practice, of the signs which declare themselves through the medium of the lungs in every case of unsound heart. The practice which they suggest not only aids the lungs in the office of relief which they are performing to the heart, but it protects the lungs themselves against the mischiefs which are perpetually threatened to their own structure. For though the lungs may not hitherto have suffered disorganisation, yet nature is urged by a hard necessity and is making of them (if I may so say) a perilous use. Exorbitant secretion and hæmorrhage cannot be frequently demanded and frequently supplied from the bronchi and their extreme ramifications, without danger of injury and disease to the whole lung. Such an event we may ward off for a time; and, as long as we succeed in so doing, we preserve for our patient his best chance of life. But, in the event, the lungs can hold out no longer, and undergo changes of structure which more and more embarrass and finally abolish their vital functions. Thus we have condensations and softening and apoplexy.

Such are the operations carried on by the blood-vessels through the medium of the lungs when the heart is unsound; and such is the greatest amount of possible success which medicine can reach in aiding them or restraining them and in rendering them harmless. There is no more interesting field of pathology and practice

than this. And herein there is great need of watchfulness, that what is going on between the heart and the lungs should be well made out from time to time, and that medicine, which waits to be guided by our view of its necessity, should be brought to bear seasonably upon its objects as they arise.

But no degree of watchfulness, no degree of skill in the use of remedies will obtain the greatest success in all cases or procure a long continuance of life. For circumstances will prevent it.

Those circumstances which have been already set forth as capable of aggravating the secondary diseases of an unsound heart, are all apt to interpose when such diseases especially declare themselves through the lungs. And those circumstances, already noted as limiting the expectations of medicine for their relief, are all apt to intrude their counteracting influence when the special scope of our treatment is the lungs.

The difference between one form of unsoundness and another in the heart itself; the presence or absence of coincident disease in other organs; the patient's constitutional health, the state of plethora or anæmia or the state equally removed from both; the patient's accidental condition respective to external circumstances, whether he be doomed to a life of labour or can choose a life of ease; all these contingencies, whose importance

has been anticipated, now find room to make a signal display of their power.

As to one form of unsoundness in the heart; if the heart beat with an excessive impulse yet with perfect regularity and the pulse at the same time be full and strong and steady, the secondary affections of the lungs (other circumstances being favourable) are likely to be of easy management for a long period. The heart is now probably in a state of simple hypertrophy. It has gained a simple increase of organic power and so is acting injuriously upon the circulation; and the circulation seeks relief through the lungs. Here the treatment is a treatment of restraint: that treatment which tells most plainly and speedily upon its objects and is the easiest and simplest of all modes of treatment. And should there be now a bronchial or vesicular crepitation of small extent and short standing, it is remarkable how rapidly it and its attendant dyspnœa are often swept away by a single cupping. Should the same crepitation be of larger extent and longer duration, should portions of the lungs be even condensed, the same treatment repeated may be trusted for bringing about the same result. And not only this, but the unsoundness of the heart being a simple hypertrophy and other circumstances being favourable, affections of the chest still more formidable are found to admit of abatement or suspension or temporary removal; such as habitual

or frequent recurring hæmoptysis and hydrothorax. These are the cases in which the remedial power of digitalis is often eminently displayed. They are peculiarly the cases for its use. One chief object of our treatment is (I repeat) to put a restraint upon the excessive force of the heart's action; and this our cupping and our leeches, while they are subsidiary to the lungs in their present distress, contribute at the same time to effect. And digitalis effects it by a direct and specific virtue of its own.

But I must not make it an express indication of treatment in these cases to put a restraint upon the heart's action without adding this necessary caution. Do not seek to bring down the impulse of the hypertrophied heart to the level of the healthy heart. This is not necessary in furtherance of the curative effect of our remedies. Besides, you can only do it by the extravagant use of one of two remedies. You must run the chance either of poisoning your patient with digitalis or of bleeding him into anæmia.

Further as to another form of unsoundness in the heart; if the heart beat with defective impulse and with great irregularity, and the pulse be small and weak and fluttering, then the secondary affections of the lungs, even though other circumstances be favourable, are more difficult to manage and more full of peril. The heart is now attenuated or softened or it is dilated without a proportional

increase of muscular substance. It has lost organic power.

Now it may pass for a maxim in physic, that weakness is always less manageable than strength. And here there is nothing but weakness and the natural result of weakness, *suffering* not acting. Here auscultation may detect the same conditions of secondary disease within the lungs as in hypertrophy. But they are only *mechanically* the same, they are *vitally* different; and medicine does not promise the same success in their treatment. Here as in hypertrophy the respiratory murmur is obscured or superseded by crepitations of various degrees and extent. But in hypertrophy the catarrhal and hæmorrhagic states of the bronchi, the pulmonary and pleural effusions imply something active and often partake of an inflammatory character; whereas here they imply something inert and passive.

In hypertrophy of the heart, or that unsoundness which increases *strength*, we treat the secondary diseases of the lungs by cupping and leeches and counter-irritants, and we look for some marked and essential relief; we look for their suspension, their abatement or temporary removal. — And in attenuation or softening of the heart, or that unsoundness which brings *weakness*, we may still treat the secondary diseases of the lungs by cupping and leeches and counter-irritants, but we look for nothing great or striking or complete in the way

of relief. It is enough if, by thus making a new outlet for the pent up blood, we succeed for a while in taking off some part of their burden from the heart and lungs.

In the case of hypertrophy, while our remedies were addressed to the special relief of the lungs, I spoke of it being a further indication of treatment, either by pushing the same remedies a little further or by the use of others auxiliary to them, to put restraint upon the force of the heart's action. But this is the very thing we must guard against in the case of attenuation or softening. The heart's action wants sustaining and not restraint. While by our cupping and our leeches we are seeking to take off its burden from the circulation, we must be ready at the same time, if need be, to support and stimulate it. While the heart is flapping and fluttering and its feeble movements can scarce be felt, and the blood is almost stagnant in the vessels going to it and from it, and almost stagnant in the lungs, we cup and we leech and we may even venture to use the lancet and let out two or three ounces of blood from a large vein, but in the mean time we must give our patient wine or brandy.

Thus, I have taken hypertrophy of the heart on the one hand, and attenuation and softening of the heart on the other, for the sake of comparing or contrasting the character and curability of their secondary diseases which declare themselves in

the lungs. And it plainly appears that they exhibit a great difference in these respects according as they spring from one or the other form of unsoundness.

Now the differences here denoted in the character and curability of the secondary diseases of the lungs, springing from these two forms of unsoundness in the heart, may be taken to represent all the differences which can arise, be the form of unsoundness what it may. For practically and with reference to their secondary diseases, all forms of unsoundness in the heart may be reduced either to that which augments or that which diminishes its organic power. Practically they are all either an hypertrophy or an attenuation.— They make the heart either over strong or over weak. Valvular injury of small amount often stimulates the heart to the exorbitant impulse of hypertrophy, though there is yet no hypertrophy in fact. And valvular injury of great amount reduces the heart to the feeble, fluttering, irregular impulse of attenuation, though there is yet no attenuation in fact. Nay! valvular injury, when it is such as to produce extreme constriction of its orifice, will bring an hypertrophied heart down to the conditions of an attenuated heart and make it flutter and falter with an irregular and a scarcely perceptible impulse.

While, therefore, it is generally true that the secondary diseases of the lungs take their cha-

character and their measure of curability from the form of unsoundness subsisting in the heart, it is not so strictly true as that they have *always* one character and one measure of curability where the form of unsoundness is the same. It might be so, if all the processes concerned were merely mechanical. But here the mechanical cause works through a vital agency. The structural unsoundness of the heart compels it to a new mode of vital action; and this it is, which *immediately* determines what the secondary disease of the lungs shall be. Yet inasmuch as the same form of unsoundness *generally* induces the same mode of action in the heart, it is *generally* safe to refer at once to this unsoundness as if it immediately determined the character and curability of the secondary disease of the lungs. But since the same form of unsoundness, as it may be less or greater, simple or complex, *sometimes* induces different modes of action in the heart and the consequent pulmonary disease affects a different character and has a different measure of curability accordingly; it follows, properly speaking, that the heart's mode of action rather than the heart's form of unsoundness is the real motive of the secondary disease and the guide of its treatment.

But have not I been speaking rather too much of the heart and the lungs, as if they could suffer together and could (as it were) bear each others' burdens, and could carry on their mutual diseases

between themselves, other parts of the body having little or no share in the matter? Perhaps I have. Medical teaching however, if it is to be useful, must sometimes be engaged in (what may be thought) an extreme analysis. For the sake of rendering the nature of disease well understood it is allowable to seize upon its simplest forms and to make much of them and to dwell long upon their explanation, before we proceed to the more complex. No matter, that the simplest forms are the rarest. They are the rudiments of all the rest; and our knowledge of all the rest is based upon our knowledge of *them*.

Yet perhaps upon the whole the heart and lungs will be found to keep their intercommunity of morbid action and suffering exclusively to themselves oftener and for a longer time than other organs; and their relative dependency of function may account for this. But still it must be a small unsoundness of the heart, which does not make itself felt beyond the lungs; and, besides being small, it must be either stationary or very slowly increasing, still to make itself felt by the lungs, and not beyond them for any considerable period of a man's life. And, further, the secondary disease or ailment of the lungs must also be of small amount to admit of the same habitual restriction.

And this is really sometimes the case. A small degree of hypertrophy may be stationary or very

slowly increasing for years, augmenting the natural impulse of the heart at all times a little, and occasionally a good deal, and hurrying the respiration at all times a little, and occasionally a good deal. So too a small degree of hypertrophy may be combined with a small degree of valvular injury and both may be stationary or increase very slowly for years; and for years the consequent suffering will be restricted to the heart and lungs, and will not exceed the amount specified in either. A certain degree of attenuation also may be stationary or very slowly increasing for years, diminishing the natural impulse of the heart at all times and occasionally making its beats irregular; and, though it do not make itself constantly felt by the lungs, yet it may hinder the man from any very vigorous or long-continued exertion on account of shortness of breath. Many people (it is well known) have an habitually feeble circulation and an occasionally irregular or intermitting pulse all their lives. Yet they pass for well, and really are well in their own consciousness, and live as long as other people. In several such I have convinced myself (as far as it is possible to be convinced about such a matter) that their heart has been weak of structure, and of small size in proportion to their stature; and it is a curious fact that most of those in whom I have found this condition of heart have told me, that they were always short-winded

and that at school they could not exert themselves like other boys; they were accounted bad runners. These are small things indeed; but they are the elements of greater things, and therefore they are worth mentioning.

The brain comes next to the lungs in its ready acceptance of injurious influences from an unsound heart. Dr. George Burrows has made good this conclusion by bringing together the scattered experience of others, and setting it in order, and testing it, and illustrating it by a larger and better experience of his own.*

Already I have said something of the troubled functions of the brain during the actual progress of acute inflammation in the pericardium, in the endocardium, and in the muscular structure of the heart, and during the period of their precarious reparation; I have spoken of the diversity of form which belongs to them, and of their perilousness and fatality, and of the strange disguise of their true origin in the heart under the more prominent symptoms referable to the brain, such as delirium and convulsions. Here surely there is more than we can yet account for from the known pathology of blood and blood-vessels and from mere derangement of the circulation.

But the heart, in its various chronic forms of permanently abiding and still increasing unsound-

* Burrows on Disorders of the Cerebral Circulation.

ness, does not lose the power of influencing the brain injuriously and fatally. And now it is much easier to see it acting through the medium of the circulation. This is a great subject, and I would willingly leave it to the lucid exposition of Dr. George Burrows*; but, as it falls in with my purpose, so perhaps I may be expected, here to state summarily what I know of it.

I would state then summarily, that it belongs to the heart, in its different states of permanent unsoundness, sometimes to affect the brain perilously or fatally, the brain itself being altogether free from disease; and sometimes only to bring the disease, which already exists within the brain, sooner, and more inevitably, to a perilous and fatal event. The work may be entirely of the heart, or it may be shared between the heart and the brain.

I would mention especially two forms of cerebral affection, contrasted with each other, and always perilous and often fatal, which are the entire work of the heart but derived from different states of unsoundness within it.

The first is apoplectic coma, coming and going (when it *does* go) under these conditions. There is stertorous breathing, and foaming at the mouth and present insensibility, and lividity of the lips and some distortion of the features. The needful

* Burrows on Disorders of the Cerebral Circulation, p. 105.

remedies are applied. As much blood is taken from the temples by cupping as can safely be borne, and sense and consciousness are gradually restored, and *no paralysis is left behind*.

Here neither serum nor blood, I presume, has been let loose upon the brain. The whole mischief is effected by the blood still within its proper vessels, by its congestion, retardation, or remora. How this came to pass, the coincident unsoundness of the heart is ready to explain. The disease consists of passive dilatation. There is a ventricle (commonly the right) of large capacity, with such a condition of its parietes as brings loss of power, *i. e.* dilatation either without proportionate hypertrophy, or with positive attenuation or with conversion of muscle into fat.

This form of apoplectic coma I have witnessed in many individuals, and (what is more instructive) again and again in the same individual. There is great peril in it. The brain must be set free or the patient will inevitably perish. The treatment by bloodletting, as far as I know, can alone do this, and place the patient in present safety. But this treatment needs great care in the management. Knowing the case I have had to deal with, and minding to use all needful caution not to exceed the requisite measure, nevertheless I *have* sometimes exceeded it, and my patient after cupping has past from coma to convulsions. So

difficult is it sometimes to avoid the mischances of a needful remedy!

The other form of cerebral affection in which the brain suffers secondarily and derivatively from the heart has, as far as I am informed, been nowhere pointed out. And indeed it is confirmed to me by much fewer examples which I can call to mind than the apoplectic coma. Nevertheless, when it *does* occur, its character is so plain and unmistakeable, that I cannot doubt the reality of the thing which I am speaking of.

The heart by the simple vehemence of its action has the power to kill; and to kill through the medium of the brain. The head is racked with continual pain. There is little or no sleep. The patient becomes delirious, then maniacal, then convulsed, and he at last sinks from exhaustion of his nervous system.

I have already given a case which had this termination.* Hypertrophy and dilatation of the left ventricle followed the unrepaired effects of acute endocarditis and pericarditis. The liver had been enormously congested. Fluid had been largely effused into the cavities of the pleura and peritoneum and generally into the cellular structure throughout the body. But liver and lungs and pleura and peritoneum and all the cellular structure had been unloaded and brought back

* Vol. I. p. 330.

to the apparent conditions of health. Thus the patient was set free from the more formidable consequences of his disease ; and the disease itself was brought back within the limits of its original seat in the heart. The same consequences never returned. But in three weeks more he was dead. He died in the manner specified. The heart, I repeat, by the simple vehemence of its action had the power to kill, and to kill through the medium of the brain.

There are yet other cases in which death takes place *through* the brain but *by* the heart ; *through* the brain affected a good deal after the same manner which has just been described, and *by* the heart acting with the same unappeasable vehemence ; this vehemence however being induced by other conditions of disease within it. I have seen a few instances of death from chlorotic anæmia. What has then been the exact physical state of the two organs I cannot tell, but the symptoms during life have taken their direction from the heart to the brain. The excessive energy of the heart and arteries has sensibly worn out the brain, and the course of events has followed in this fatal order ; sleeplessness, delirium, mania, exhaustion, death.

But it has been said that it may belong to the unsound heart only to bring the disease, which already exists within the brain, sooner and more inevitably to a perilous and fatal event. Apoplexies and palsies and epilepsies are thus often shared

between the brain and the heart. There is enough in the brain to produce them but not enough to produce them *yet*. There is enough in the heart to lead to them but not enough *yet* to bring them actually to pass. The ossified bloodvessels of the brain want some unnatural congestion or some extraordinary impulse, such as an unsound heart can give to the blood within them, that their disease may have its present effect in effusion, or hæmorrhage. And the unsound valves of the heart or its active or passive dilatation must have their capacity of doing injury to the brain, helped and exalted by the ossified bloodvessels of the brain itself.

But the external influence thus fatally felt by the brain does not always proceed simply and exclusively from the heart. When the unsound heart does a prior injury to the lungs, then it and the lungs are apt to work together conjointly to the further injury of the brain. The brain is racked and exhausted by the vehement impulse of its bloodvessels, or oppressed by their congestion, and thus much it owes to the unsound heart. But the brain is also poisoned and narcotised by an impure undecarbonated blood, and thus much more it owes to the damaged lungs.

Any unsoundness of the heart, which is of considerable amount and still progressive, is apt to carry its secondary diseases beyond the lungs and beyond the brain. And, wherever they are found

they are still of the same kind, and blood and bloodvessels are still the agents of them. Thus the liver is sometimes found filling half the abdomen, and this enormous increase of its bulk is owing to the accumulation within it of blood and bile. Such a condition of the liver is the more especial accompaniment of those forms of unsoundness in the heart, which arrest the blood in its return through the veins, of attenuation, of softening, of dilatation without proportionate increase of muscular power, and of great valvular impediment.

It would carry us beyond our subject to enlarge further upon these secondary affections of particular organs. But that which, in the nature of secondary disease, chiefly declares the all-pervading and all-subduing power of the original malady of the heart, remains to be considered, I mean general dropsy.

The secondary diseases of the lungs and of the brain carry with them their own peculiar dangers. For these organs are eminently vital in their office and use. But the secondary diseases of the lungs afford the more delicate test (so to speak) of what is amiss within the heart. For both are so strictly bound together by their relative dependency of function, that all which goes wrong within the heart, from the least thing to the greatest, the lungs are ever ready to feel and to show that they feel. Yet the first appearance of dropsy in distant

parts, while it denotes no present danger and calls for no instant remedy to save life, proclaims a greater mischief. It declares the heart fatally damaged as the centre of all life and of all function throughout the body. “The silver cord is loosed; the pitcher is broken at the fountain.”

LECTURE XXXVI.

THE NATURE OF DROPSY WHEN IT PROCEEDS FROM AN UNSOUND HEART. — THE PURPOSE IT SERVES. — TREATMENT. — ITS OBJECTS. — ITS SUCCESS, WHEN THE DROPSY IS SMALL, UNDER FAVOURABLE CONDITIONS. — ITS SUCCESS, WHEN THE DROPSY IS LARGE, UNDER FAVOURABLE CONDITIONS. — WHAT THESE CONDITIONS ARE IN EACH CASE RESPECTIVELY.

DROPSY is indeed a large field. But I have only to do with what is proper to it and to its treatment, when it results from an unsound heart; and I will take the best heed I can to keep within the due bounds of my subject.

Now what is proper to dropsy when it results from an unsound heart is this, that nature intends by it her own relief, and in different measures succeeds in obtaining the relief which she intends. But I can hardly expect you to understand what I mean without some explanation.

Dropsy consists pathologically of two parts. One part is the act of separating the serum from the mass of blood, the other is the accumulation of the serum after it is separated. The first is the essential morbid process, *the* disease; the second, though it be popularly considered the disease, is only an unfortunate accident; for if the general

cellular structure and the circumscribed cavities into which the serum finds its way had any direct outlet, then there would be no accumulation, and in the popular sense there would be no dropsy.

When therefore I say that, in cases of unsound heart, nature intends by the dropsy her own relief, I mean, that she does so by the essential process of which it consists, not by what accidentally follows it, which is an undeniable evil. It is good that the serum should be separated from the blood; for the present necessity requires it. But it is evil, that the serum being separated should accumulate within the body; for it harms and hinders the functions of every organ upon which it rests by bringing upon them an unnatural incumbrance.

In speaking of what *nature intends* it is difficult not to use language which may seem to favour some foolish hypothesis. But in point of fact we always must form a judgment of what nature is aiming at whenever we interfere with what nature is doing. And as our practice is sometimes right, it is presumed that a right judgment is both attainable and sometimes attained.

In this dropsy then, which results from an unsound heart, our views of treatment will be simplified by keeping in mind these two points, 1st, the relief which is sought by the effusion of serum. Yet 2dly, the mischief which actually follows its accumulation.

Rather a subtle refinement, however, perhaps you will say, thus to claim a character of good in its design for that which inevitably terminates in evil! It is like taking a *salutary* leap into perdition. But we shall see. Let the matter be taken as I state it for the present.

In every case of unsound heart the first appearance of the least dropsical symptom marks an eventful period: it marks the period when a new law is beginning to take effect in the circulation and to gain a mastery over the law of health. The law of health of which the sound heart is the prime agent, retains the blood within the blood-vessels, or dispenses it only for the needs and uses of health. The new law, of which the unsound heart is still the prime agent, suffers or forces the blood or some of its constituents to escape and to form accumulations of serum out of the courses of health.

A little œdema of the ancles or a little œdema of the face is a sufficient notice of the first yielding of the bloodvessels to this new law, which is no other than a mechanical necessity against which they can no longer hold out. It is the earliest beginning of serous effusion, which may go on increasing until it has pervaded the entire cellular structure and filled every serous cavity of the body.

All this calls at once for medical treatment. But what is to be done? The circulation *must*

have the relief it seeks somehow. Disburden itself it *must*. There is a physical necessity in the case from which we cannot set it free. Or if we could, it must be by interfering remedially with the actuating cause, *i. e.* by curing the unsound heart. But this is impossible. What then can be done?

This can be done and this only. Seeing what nature is doing and must do, we can only go along with her and seek to aid her in accomplishing her own purposes through other and less hazardous channels. Nature is seeking relief by directly evacuating the bloodvessels of their contents. We must try to gain for her the same relief by augmenting natural secretions and so evacuating the bloodvessels through natural channels. The kidneys and the intestinal canal and its subservient viscera are the most eligible for the purpose.

Here I would remark that it is most fortunate when we have the opportunity of witnessing and treating the dropsical symptoms of an unsound heart upon their first appearance. Much may now be done for the protection of life by a just appreciation of what is going on and by skilfully ministering to it. A swelled ankle or a swelled eyelid is an important indication of medical treatment in every case of unsound heart, from the vast meaning which it conveys.

This happy opportunity of treating the drop-

sical symptoms of an unsound heart at as early a period as possible is afforded chiefly by a certain class of patients, by those who are rich and well-off in this world. Such men, besides the ampler share they have of the good things of this life, have also readier means of averting or lessening its evil things. They cry out as soon as they are hurt, and they no sooner cry than they get well attended to, and obtain all the aids of medicine, just when it is most likely to do them good. But the poor man looks down upon his swelled ancles a long time without complaining. He hardly cares about the matter, until the swelling reaches his knees, and seldom thinks of applying for advice, until it is much more extensively diffused.

When, therefore, the happy opportunity just described does occur, we often succeed in dissipating small dropsical swellings, or in preventing their increase. And we succeed, not by any severe discipline long continued but by gentler methods occasionally employed; by medicine now and then addressed to the bowels or to the kidneys, which obtain from one or the other for a few days together discharges, which somewhat surpass the natural measures of health. The circulation being thus easily disburdened from time to time, is kept from the necessity of larger effusion, and the œdema after the lapse

of years, in some fortunate cases, is still trivial in itself and formidable only as being inceptive and premonitory of something worse.

Now observe, medicine is here concerned only with one part of dropsy and that too the easiest to manage. There is only just visible swelling enough to denote the fact of serum being in the course of separation from the blood-vessels.

But when we thus succeed in abating or suspending or entirely removing the dropsical swellings of an unsound heart from time to time or for a long time together, and when we thus anticipate or alleviate the miseries of existence and put off death for years, there must be more in our favour than the mere fortunate opportunity of commencing our treatment with the commencement of the secondary disease. The primary unsoundness of the heart itself must not be of the worst kind; neither valvular injury enough to produce great *positive* obstruction, nor attenuation or softening enough to produce great *virtual* obstruction. There must be no concomitant disease of great amount in other internal organs, in the liver, in the kidneys, in the lungs; no diffused unsoundness of great amount throughout the arterial system, no marked constitutional pravity, no decided plethora or anæmia. A moderate hypertrophy or a moderate attenuation almost stationary or slowly increasing, with very

little valvular injury or none at all, may be the actual form of unsoundness. This would impede the circulation enough to call upon nature for relief by direct separation of serum from the bloodvessels; while it might admit of a substituted and less hazardous relief, by an increase of secretion from organs having a natural outlet.

But the happy opportunity before described is often lost, and the dropsy from an unsound heart has often proceeded to large accumulations before its treatment begins. And this especially happens when the poor man is the patient. The poor man, the victim of an unsound heart, is often brought to the hospital having every part of his body, which can contain effused serum, already filled and distended with it, yet hitherto nothing has been done or attempted for his relief. Here medicine has a much harder work to accomplish from the first. It has both parts of dropsy to deal with. It has a vast amount of accumulated fluid to get rid of, and then to prevent it from accumulating afresh. Yet it has wonderful success in some such cases.

Here the most powerful remedies given and repeated as frequently as the strength of the patient will bear, are indispensable to the purpose that we wish to achieve. Large dropsical accumulations are seldom drained off, by the operation of diuretics, through the kidneys alone. They subside rather under the purgatives, which obtain

day after day large watery evacuations from the bowels.

But a wonderful success (I repeat) is sometimes obtained even under the disadvantage of late treatment. And, if when time and opportunity were with us, we had need that the essential condition of the disease should also favour us, in order to compass the easier task of keeping down the dropsy which had only just begun to appear; surely, when time and opportunity are now against us, and yet we are able to compass the much harder task of first getting rid of a largely accumulated dropsy and then of keeping it down in future, there must still be some essential element in the case which is greatly propitious to our remedies.

Recollect all the conditions already mentioned, the particular form of unsoundness in the heart and the absence of coincident disease in other organs, which came in aid of the fortunate opportunity and enabled us to deal successfully with the smaller dropsy. The same must now be found ready to compensate the loss of the fortunate opportunity and ready to help us in dealing with the larger dropsy, or we shall not deal with it successfully. All these conditions there *must* be; and there is as far as I have seen, and perhaps there must be, something besides.

Now this I have observed. Where the unsoundness of the heart is the same in kind, dropsy

will show itself at different periods of its progress in different cases; earlier in one man and later in another. I do not pretend to explain the universal reason of such diversity; but I think I see *a* reason for it which will hold good to a large extent. Among the various ways in which the fortunes in life of those, who are the subjects of an unsound heart, can modify the expectations derived from the intrinsic conditions of their disease, there is one which is very remarkable.

In those who are well-off in the world, dropsy seldom arrives until the unsoundness of the heart has reached the point, at which the circulation can endure its oppression no longer without seeking relief by effusion of serum. But in those who are ill-off, dropsy often appears long before the unsoundness has reached the point at which it would naturally and necessarily take place. In the first the injurious operations proper to the heart's unsoundness are less accelerated by accidental circumstances, and so its evil consequences and dropsy among the rest are found to tarry, until it has itself become absolutely great enough to produce them. In the second its proper injurious operations are unavoidably quickened day by day and every hour of the day by accidental circumstances; and so a smaller disease in one case is more felt than a larger disease in the other, and its evil consequences and dropsy among the rest arrive sooner.

We may well be surprised at the complete success which occasionally attends our treatment of the vast dropsical accumulations, which accompany an unsound heart. But in such cases it will be found that, but for the patient's unfortunate circumstances, there would have been no dropsy at all, the affection of the heart being not yet ripe for it.

It is within my experience that the same individual, having an unsound heart, has been received into the hospital again and again and discharged again and again after the complete cure, for the time, of vast dropsical accumulations.

A young man, who had been cured before of very extensive dropsy more than once, and had returned to his occupation, was carried into the hospital now in a state, which seemed far beyond all hope of relief. His legs and thighs were immensely swelled, his countenance was dusky, his lips livid, his eyes vascular, and almost starting out of his head, his air-passages loaded with mucus, his jugular veins prominent, his heart acting with great vehemence within the chest, and the pulse at the wrist very small. He was at once moderately bled from the arm with immediate relief; and in a few days he was moderately bled again. Leeches were applied to his chest. All the secretions of his body were solicited by suitable remedies. In three weeks he was walking about the ward and begged to be discharged,

thinking himself well. And indeed he had entirely got rid of the dropsy, the cough, the expectoration, and, in some measure, of the venous congestion. The lungs were freely pervious to air without any unnatural sound. The symptoms immediately referable to the heart were the only symptoms which remained; and these were such as denoted moderate hypertrophy and a small amount of valvular disease. The secondary diseases, the dropsy and the bronchial and pulmonary congestions and inflammation and catarrh, had all come on prematurely. He would have had none of them, if he had not been obliged to labour for his bread.

At the time this young man was admitted into the hospital, and all the while he remained with us, and still after he left us, there was in the same ward a little boy. And the little boy lay in the next bed to him, and saw him brought in in a dying state, and witnessed how every remedy told for his relief; how day by day he became better and better, until all his dropsy and all the anguish of his chest were gone, and he could now walk about like other men; and how in a few weeks he left the hospital apparently well.

Now the little boy had the same disease as the young man. His whole body was dropsical, his heart beat with a violent impulse, and he had great anguish of respiration. And, when I came to his bedside each day and still found him no better, I fancied by his looks that he was ready to say,

“ And why cannot you cure me as well as him? I am not as ill as he was. But now he is well, and why am not I well also?” It is true, that there was in the little boy a less amount of secondary disease, less of dropsy and of pulmonary congestion and catarrh than in the young man, but there was a greater amount of unsoundness in the heart. Yet it was the same in kind; the symptoms immediately referable to the organ denoted *great* hypertrophy with valvular disease. No medical means procured him more than a very slight and a very brief alleviation of suffering. And he died.

More, much more, might be said upon this subject of dropsy, as well as of the other secondary diseases, proceeding from an unsound heart. But I must keep within reasonable limits, and be content rather to fix attention on what is most desirable to be known, than wish to say every thing that can be said.

As to the management of these same secondary diseases, I have dwelt more upon principles of treatment than upon particular remedies. For congestions, effusions, hæmorrhages and inflammations, from whatever cause they spring, our remedies are numerous enough. Indeed I wish they were fewer. For then perhaps we should better understand their use and do more good with them in the end. The difficulty is not so much to find a remedy as to choose one.

And indeed for congestions and effusions, hæmorrhages and inflammations, when they proceed from an unsound heart, there is less need of seeking distinct and appropriate remedies. As they come from a common cause, and are of a kindred nature, and are apt to occur together or interchangeably in the same subjects, so we are much oftener called upon to treat them together or interchangeably by the same, or by little variation of, remedies, than to treat them one by one, as separate results, each by a remedy proper to itself.

Such is the best summary I am able to give, within the compass which I have allowed myself, of this very large subject, comprehending the manner in which unsoundness of the heart in its various forms makes itself felt in the vascular system, and through the vascular system in every organ and in the functions of every organ; and how thus it gives occasion to various kinds of secondary disease. I have wished to make my summary a fair transcript of the truth. But there is a certain imperfection in our knowledge of all these matters which we have been handling, rendering it a difficult task to give such descriptions of them as will be at once seen and recognized as true.

There is that in the nature of chronic disease, which makes it only half disclose itself. It, discloses itself only in its results, and not in its ope-

rations. Whereas acute disease discloses itself in both. The knowledge therefore, which we have of chronic disease, is only a half knowledge compared with what we have of acute. In chronic disease we see only what it has done, not what it is doing ; in acute disease we see both.

Coleridge, in one of his profound moral speculations, speaking of the difference between the secret and slow-working influences, which imperceptibly change men's opinions and professions, and those violent motives which revolutionize them at once, makes use of this beautiful illustration : " The difference is merely that between the hour-hand and that which tells the seconds on a watch. Of the former you can only tell the past motion ; of the latter both the past motion and the present moving." Just such is the difference between chronic disease and acute. Of the former you can see only the past effect ; of the latter both the past effect and the present effectuating.

But not only is the task of describing chronic disease rendered difficult from the imperfection of our knowledge, but also from the manner in which such knowledge as we have must needs be obtained.

We learn acute disease from seeing it as a whole ; from seeing it as it is acted and suffered through all its stages by the same individual men and women. Being an affair of a few days or a few

weeks only, we are often present as eye-witnesses of it from first to last. Thus our knowledge of it is drawn from single and complete histories. And a few cases well watched and remembered are enough to make that knowledge of considerable amount.

Now the mode of obtaining our knowledge being thus easy and summary, the mode of imparting it need be no less easy and summary in its turn. And so the description of acute disease is never difficult, if the describer, mindful that his own knowledge of it came to him by the simple observation of closely consecutive facts, be content to give a simple and consecutive account of them.

But it is very different with chronic disease. We do not learn it from seeing it as a whole, as it passes through all its stages in the same individual men and women. Being an affair not of days or weeks, but of months and many months, and oftener of years and oftener still of many years, we are indeed very seldom present as eye-witnesses of it from first to last. Thus our knowledge of it is not drawn from single and complete histories, but put together piecemeal from numerous imperfect ones. And after all we get more knowledge complete and at once from a single case, when the disease is acute, than we gather piecemeal from twenty, when the disease is chronic.

Now of knowledge so obtained it is very difficult to give a consistent and summary account. And thus a description of chronic disease can hardly be made intelligible without some artifice or management, which may prejudice its truth. The most useful and perhaps only just representation that can be made of chronic disease is not in the way of description but of commentary ; of commentary upon the great facts arising in the course of its duration, which mark its periods and stages ; which denote its pauses, its retrogression or its advance ; which furnish indications of treatment ; which announce its invasion of important organs or systems of organs, and the holding out or surrender of the sources of life.

LECTURE XXXVII.

AFFECTIONS OF THE HEART, CONSISTING IN A CERTAIN ASSEMBLAGE OF SYMPTOMS, NOT IN EXPRESS FORMS OF DISEASE — GENERAL REMARKS UPON THEM — THEIR PATHOLOGICAL CHARACTER — THEIR TREATMENT. — ANGINA PECTORIS. — ITS PATHOGNOMONIC SYMPTOMS. — ITS EFFICIENT CAUSE ; NOT ANNEXED TO ANY ONE FORM OF UNSOUNDNESS IN THE HEART, BUT PROBABLY PRODUCED BY SPASM, WHICH IS INCIDENT TO MANY. — SUDDEN DEATH WITHOUT PREVIOUS ILLNESS. — CASES. — PROBABLE CAUSE, SPASM OF THE HEART, OR A FIRST ATTACK OF ANGINA PECTORIS.

AN interesting portion of our subject yet remains, which will be found different from those portions of it hitherto considered, as in other respects so chiefly in this, that it has a less objective character.

The practical purpose of these lectures has required us all along to look at diseases of the heart, through their living developments. We have indeed regarded them in different lights and perspectives and from opposite sides, and near and from a distance, but always through the medium furnished by living circumstances. For what has their clinical diagnosis comprised, but the nearest living manifestations of their actual

presence? and what their clinical history, but those prior and accompanying conditions in the life and health of the patient, which were found variously leading to and variously promoting and causing them; as well as all those subsequent conditions in the life and health of the patient variously springing *from* them and variously promoted and caused *by* them? and what was their treatment conversant with, but the means of influencing those same conditions and of influencing them for good?

But, withal, we have never lost sight of the objective reality of the diseases themselves. We have had by turns present to our minds an endocarditis or a pericarditis; a stricture at this or that orifice, an unsoundness of this or that valve; an inflammation or suppuration, an ulceration or a rupture of the heart's muscular substance; its hypertrophy or its atrophy, its softening or its dilatation.

As we have dealt hitherto, so we would continue to deal with our subject. But what if our subject, in much that remains of it, will not so be dealt with? We would still look through their living developments at the *diseases themselves*. We would still bestow our chief care where we did before, and be found grouping and analysing symptoms and calculating what they mean as notices of something beyond themselves and as guides of treatment; but reserving the name and

character of diseases for those sure and more definite objects from which they issue as natural results and emanations.

But what if none such can be found? What if, beyond those living manifestations which properly bear the name and character of symptoms, we discern darkly only and doubtfully or not at all, any surer objects which can bear the name and character of diseases?

Why then we must be content to rest in the symptoms, and to bestow some summary or generalising name upon them, as if they were *the disease*. They indeed are not the disease, and we know that they are not. Yet in attempting to look through them and beyond them we gain so questionable a vision of what the disease really is, that we act wisely in stopping for the present where our knowledge stops, or in being cautious at least that the terms we use do not import more than we understand.

There is one eminent instance in which an assemblage of symptoms is thus made to bear the name of a disease; angina pectoris. This angina pectoris has existed indeed where there has been ossification or obstruction of the coronary arteries, where there has been dilatation of the aorta, where there has been valvular unsoundness, or hypertrophy or atrophy, or softening or conversion of the heart's muscular substance into fat. It has been coincident with one and one only of these

forms of disease or disorganization or with two or more of them in combination. And it has existed where no form of disease or disorganization whatever has been found either in the heart or in the bloodvessels nearest to it.

Our knowledge then of angina pectoris stops short with its symptoms. The idea of it cannot be made to rest in any definite form of disease beyond them. We are sure of what it is as an assemblage of symptoms. We are not sure of what it is as a disease.

There is an use sometimes in thus measuring the limits of our knowledge. In a profession like ours it is not enough to lament its imperfections. We should rather seek to understand wherein they consist, and so learn to bear with them and to make the best of them.

Medicine is a strange mixture of speculation and action. We have to cultivate a science and to exercise an art. The calls of science are upon our leisure and our choice; the calls of practice are of daily emergence and necessity. Science may minister to practice much or little. But whether science help us or fail us, whether its instrumentality be sufficient or defective, still we must act. We are bound to the constant endeavour of doing the best we can whether upon a perfect or an imperfect knowledge.

The imperfection of our knowledge, now especially pointed out, is, where all our pretensions

to be exact must rest in the character of the symptoms and cannot reach to the nature of the disease. But let us be just at least to such pretensions, and not run away with the notion that this knowledge is no knowledge at all. For the fact is far otherwise. Often indeed, where there is much more knowledge besides this, yet is it this and this only that can be made use of; and all the rest goes for nothing when we come to seek for guides and indications of treatment.

Think what symptoms are. They are not mere signs of the disease, but they are direct emanations from it; not things in themselves nugatory but eminently real. They are natural sensations unduly exalted or unduly depressed or variously changed or perverted. They are natural functions hurt, hindered or abolished. So that a man may often with stricter propriety be said to be ill of his symptoms than to be ill of his disease, and, what is more, to die of his symptoms than to die of his disease.

Accordingly it often happens, even where the disease is best understood, that we treat the symptoms and the symptoms only, just as if we had no knowledge of any thing beyond them. Therefore, when we have confessedly no strict knowledge of any thing beyond them and the aim of our practice must needs centre in the symptoms, we are not to lament over the shortcomings of our art and its straitened capacity of doing good.

For it does not follow, that, if we knew *the disease* ever so well, we could treat it otherwise than we are now treating its symptoms, or that what we are now doing for the symptoms would not be the best and would not be all, that could be done, for the disease itself.

Some remarks have already been made upon pain referable to the heart; to the effect that it was a very uncertain guide to the diagnosis of its diseases, and a very uncertain measure of their severity. For in some of the most formidable, as endocarditis and pericarditis, though pain was generally present, it was sometimes entirely absent, and, being present, it was often of small amount when the disease was severe, and often of great amount when the disease was trifling.

But pain with one awful accompaniment may be every thing; the prominent and all-absorbing symptom; denoting the disease, and measuring its severity. So that the very disease itself is called pain, angina pectoris or pain of the breast.

Now none can well describe the quality of a pain but those who have felt it. And the subjects of angina pectoris report, that it is a suffering as sharp as any that can be conceived in the nature of pain, and that it includes moreover something which is beyond the nature of pain, a sense of dying.

This angina, this mixture of the sharpest pain with a feeling of instant death, has its seat in the

upper, the middle or lower part of the sternum ; it passes through the chest to the spine, often inclining more to the left than to the right side. It comes suddenly and goes suddenly. This is all which constantly belongs to the disease.

Its definition might run thus. Pain of extreme severity passing through the chest from the sternum to the spine, arising suddenly and ceasing suddenly, and accompanied, while it lasts, with a feeling of approaching death. Now, although I have no great opinion of definitions for the use they serve in medical teaching, and am quite sure that their adoption generally for this purpose would convey very cramped notions of disease, yet there are good reasons for speaking very carefully (if not logically) on our present subject. Angina pectoris from the time it was first described by Dr. Heberden has always had a large share of attention paid to it. Much has been written about it, and well written, by some of the best men in our profession. But it is still of very doubtful pathology ; and its pathology has little chance of being further illustrated, unless there be a clear agreement among us what we are to understand by the thing itself.

There is a form of dyspnœa which, from its suddenness, its severity and the pain of approaching death which attends it, is very apt to be confounded with angina pectoris. From what I read in books and what I hear in my intercourse

with medical men I suspect that they both pass popularly for the same thing. But it is most needful that our ideas of each should be kept separate. As angina pectoris may in certain cases be complicated with many affections with which it has no necessary connection, so it may with dyspnœa. But the two are naturally distinct, and the first and best writer upon the subject emphatically marked the distinction.*

I believe that the definition, which has been given, includes all that is proper to angina pectoris and excludes all that is not; and that it consists essentially of pain in the chest and a sense of approaching dissolution. Not from the absolute constancy but from the very great frequency of its occurrence there is one more element, which has a claim to be considered almost as a part of the disease. Its very peculiarity forces it upon our notice. It is an extension of the pain to one or both arms, most frequently to the left and stopping at the elbow, sometimes to the right, and sometimes to both and sometimes reaching to the fingers.

But what is angina pectoris? Its symptoms, striking and definite as they are, do not carry their own interpretation along with them. They

* *Initio hujus ægritudinis cætera omnia homines valent; et seorsim nulla tenentur spirandi difficultate, a qua hic pectoris angor prorsus est diversus.* (Heberden. Comment. 309.)

tell neither whence they are, nor what is their efficient cause. Towards such information we must gain what help we can from the many circumstances which various clinical histories and various dissections have disclosed. And there are plenty of such histories and dissections upon record. I have both seen many and read many.

But all the cases, which one sees or reads of a particular disease, do not necessarily add to our knowledge. They may make the knowledge which we have more familiar without augmenting it. They may freshen our experience without enlarging it. Yet some one case out of many, from peculiar circumstances belonging to it, may teach us something, which we did not and could not learn from all the rest.

Thus I have three cases of angina pectoris to report, two falling under my own observation and the third coming to me upon the best authority, which added something at least to *my* knowledge of the disease.

R. R. was apparently about 50 years of age. I saw him for the first time in January, 1837. He looked perfectly well; but said that he had two complaints for which he wished to consult me. One was a little teasing cough which only came on at night and prevented sleep. It was all that remained of an attack of influenza he had suffered. He made light of it and said, he should not have thought of troubling me about it, if it

had not interfered with his rest. The other complaint he feared was something more serious which he would rather talk over leisurely with me the next day. But before I left the room, he gave such a sketch of a paroxysm of angina pectoris as could not be mistaken. I merely ordered him an opiate to take at night.

The next day I found that he had slept well in the night and that his cough had left him. And now he described more at large "the other complaint" which he had suffered and at which he could not help being alarmed. He dwelt upon the agony of pain in the sternum, the sense of approaching death and the pain in the left arm, and then his instantaneous and perfect recovery. Hitherto he had consulted no medical man about it. He did not know what it was; but his own feelings had awakened his fears, and he believed it to be something formidable.

Now this gentleman had during the preceding summer made a walking tour through Switzerland, during which he experienced no bodily inconvenience, and had returned home as well as ever he was in his life, and then he had, according to his custom, had his full enjoyment of shooting during the Autumn. In short, until a fortnight ago he had not had a feeling about him which gave him the slightest hint that he was not in perfect health. It was but a fortnight ago, while walking up the hill towards Hampstead, that he

had his first paroxysm of angina pectoris. During this short fortnight the paroxysms had been increasing in severity and frequency. At first they occurred every two or three days, then daily and now several times a day; at first with, and now without, an exciting cause.

I made a very careful examination of his chest. The respiration was perfect. The heart was free from all unnatural murmurs. Its beats were quite rhythmical. The exceeding feebleness of its impulse was all that deserved notice.

I saw him again in the afternoon of the next day, when he described to me a paroxysm, which he had suffered in the morning, severe beyond all his former experience. But it had entirely passed away, and he now looked quite well.

What I heard to-day made me quite alive to the extreme peril of my patient. He was a stranger to me, yet I felt uncomfortable at the probability of his dying under my care, before I had made any communication of his dangerous state to his friends. So before I left the house I obtained the address of his brother, to whom I determined to write as soon as I got home. It was an hour however before I reached home, when I found a messenger waiting to announce to me, that, soon after I left him, my patient had been seized with another paroxysm and died at once.

Upon examination after death the heart was of its natural size, its cavities of their natural capacity,

its walls of their natural thickness, and its internal lining and valves bearing no marks of disease. Its muscular substance was more loose of texture than natural, but not softened in an extreme degree, and both its coronary arteries were entirely converted into calcareous tubes as far as they could be traced. The aorta throughout the chest and the abdomen did not present the smallest space free from disease. In some parts calcareous matter was deposited between its coats, in others cartilaginous, and in others a matter between cartilage and bone. This disease, besides destroying the elasticity of the aorta at every part, had greatly narrowed its calibre at a small space of its descending portion within the chest and so produced some real impediment to the passage of blood. We did not examine the state of other bloodvessels. Other viscera of the chest and abdomen were healthy, except that there was a close and complete adhesion of the pleura of the right lung to the ribs without the least apparent detriment to the lung itself.

There was nothing extraordinary in this case as far as the mere symptoms went. These ran exactly parallel with the definition. They were neither more nor less than *the disease*, and so taught me nothing which I did not know before. But there was still a circumstance in the case which was new to me. It was this; the brief period that intervened between the paroxysm first

denoting the patient's disease and the paroxysm of which he died; between the first paroxysm and the last. In a first well-marked paroxysm of angina pectoris befalling a man apparently healthy I should have seen the harbinger of almost certain death, but, relying upon what experience had taught me, I should not have expected the fatal paroxysm to arrive for years. But here it arrived in a fortnight.

I make no observation upon what dissection disclosed in this case at present.

J. C. was 64 years of age, a robust man in a humble condition of life. I saw him for the first time, and once only, on the 25th August, 1841. He was in bed, lying on his back with a countenance expressive of the sharpest pain. The pain he described as passing from the upper part of the sternum through the chest to the back, and down both his arms to the tips of his fingers. His complexion was not paler than natural, and his respiration was a little, and only a little, hurried. Altogether he had the look of a man who must quickly die, if he was not quickly relieved. The relief came in a few minutes and he was able to answer questions.

Auscultation found his heart beating with a perfect rhythm and neither with excess nor defect of impulse. Its sounds were natural but loudly intonated and conveyed over the front of the chest far beyond the præcordial region. The

respiratory murmur was vesicular, clear, and unmixed, throughout both lungs, except perhaps at a small space of the lowest part of the right, where it seemed not quite so free as elsewhere and was accompanied by a very slight sound of moisture.

This man until within eight days had believed himself in perfect health. His first attack was on the 16th. It came on without any apparent cause, and, by the account of his medical attendant, was a genuine paroxysm of angina pectoris. His second was on the 20th. From that time the paroxysms (it was said) were many every day and many more every night. The change from the erect to the recumbent posture always produced them. That which I witnessed was caused by his going to bed for me to examine him. Their duration was between five and ten minutes. The day after I saw him he had eight or nine paroxysms, and the next day at 2 A.M. he died. The period from his first attack to his death did not exceed ten days.

An examination of the body was made on the day of his death, when the pericardium was found to contain two ounces of clear serum, and upon its surface covering the heart it presented a few small white spots. The heart itself had an appearance of general enlargement. Its internal lining and all its valves were healthy except that the processes of the mitral valve might be thought a little thickened, but not so as to hinder the cir-

culation. The coronary arteries too were quite healthy. But the muscular substance of both ventricles was so soft as to be pierced through with the slightest pressure of the finger. The aorta was entirely free from all morbid deposits. Both pleuræ were free from adhesions and contained no fluid in their cavities. Both lungs were entirely healthy and so were all the abdominal viscera.

This case like the last presented nothing extraordinary in its mere symptoms. But it, like the other, had one extraordinary circumstance belonging to it; the short, even the shorter, period that intervened between the first paroxysm denoting the patient's disease and the last of which he died. In that case it was a fortnight, in this it was ten days only.

The next case I did not see. But I give its interesting and sad particulars from the best authority.

T. A. was within a day of completing his 47th year. Up to a very few hours before his death, both body and mind seemed equally to give proof and promise of health. He still took his accustomed pleasure and refreshment in strenuous exercise. His thoughts were still busily employed upon the highest subjects, conceiving and composing with wonderful ease, rapidity, and power. He retired to rest at midnight on the 11th of June, 1842, feeling and believing

himself to be in perfect health. At a quarter before seven the next morning his medical attendant was called. What had previously occurred and what followed I will give in the words of Dr. Bucknill who was with him during the short remaining period of his existence. "On my entering his room he said that he was sorry to disturb me so soon; and that he had not sent for me before, thinking that it would go off. He added 'I have had very severe pain in the chest since five o'clock at intervals, and it gets worse I think.' This pain was seated at the upper part of the chest towards the left side and extended down the left arm. He had been rather sick. He then asked me what the pain was. 'What is it?' He was now almost free from pain. His pulse I could scarcely feel. The tongue was clean. There was cold perspiration over his face. The feet and legs were cool. The breathing at this time not troubled. I gave him immediately some hot strong brandy and water, and having ordered a mustard plaster for his chest, till this was ready I applied hot flannels and had his legs and arms rubbed, and the feet wrapped up in flannels wrung out of hot water and mustard. The pulse became natural, the extremities more warm and he was free from pain. The mustard plaster was brought and put on. It was not large enough and I ordered another. The pain then returning I gave him more brandy and water, and it soon

left him. And now he asked me again what the pain was. I told him I believed it was spasm of the heart. He exclaimed, 'Ah.' I asked him whether he had ever fainted in his life? 'No, never.' If he had had at any time difficulty of breathing? 'No, never.' If any pain in his chest before? 'No, never.' I then asked him, if any of his family had ever had any disease of the chest? 'Yes, my father had; he died of it.' He inquired if disease of the heart was suddenly fatal? I answered that it was. 'Was it a common disease?' I said not very common. 'Where do you find it most?' 'In large towns I think.' 'Why?' 'Perhaps from anxiety and eager competition among the higher, and intemperance among the lower classes.' He was then quiet and free from pain and I proposed to leave him for a minute or two. He had no pain whatever in my absence. On my return the perspiration was still in drops upon his forehead. The pulse was again feeble and I gave him more brandy and water and had the flannels with mustard renewed. An attack of pain was coming on. He said, 'I must stretch myself.' I took one of his hands and held it until the pain was gone off. It was of short duration. I said, is it gone? He answered, 'Yes entirely,' adding that he 'could scarcely bear it if it were as severe as it had been.' He then asked me 'what was the general cause of this kind of disease.'—He then said, 'is this likely to return?' I answered that I was afraid it was, but that, as

the attacks had been less severe and less frequent, I hoped they would pass off. He next asked me if the disease was generally suddenly fatal. I said generally (for those who knew him were aware that it was impossible not to tell him the exact truth). I then asked him if he had any pain. He said, 'none but from the blister; one can bear outward pain, but it not so easy to bear inward pain.' I was now dropping some laudanum into a wineglass, when he inquired what I was going to give him. I told him laudanum, Hoffman's anodyne, and camphor. And, while I was preparing the mixture and before I had finished, I heard a rattling in the throat and a convulsive struggle. I called out, and turning to him I supported his head, which was thrown back, on my shoulder. His eyes were fixed and his teeth set, and he was insensible. His breathing was very laborious, his chest heaved and there was a severe struggle over the upper part of the body. His pulse was imperceptible, and after deep breathings at a few prolonged intervals all was over. He died in little more than half an hour after I first saw him.

"The examination of the body was made forty-eight hours after death, the weather being very hot. Its external appearance evinced rapid decomposition. It was discoloured and very livid in many parts. The skin was tightly distended with air, which was found in the cellular tissue throughout every part.

“ When the right cavity of the chest was punctured a great quantity of air rushed out. The lungs on this side were healthy but their posterior part was gorged with blood and serum, and about eight ounces of bloody serum were found in the cavity of the pleura. On the left side were some old but not extensive adhesions of the pleura and about the same quantity of bloody serum was in this cavity as in the right. The lungs on the left side were healthy but more extensively gorged with blood and serum than on the right. Posteriorly they resembled soft spleen.

“ The pericardium was healthy. It contained about an ounce of serum of a straw-colour. The heart was rather large. The external surface was healthy. It was very flaccid and flat in its appearance. It contained but little blood, and that was fluid. There were no coagula of any kind in it. All the valves were quite healthy, and so was the lining membrane throughout. The orifices of all the great vessels were quite natural. The muscular structure of the heart in every part was remarkably thin, soft and loose in its texture. The walls of the right ventricle were especially thin, in some parts not much thicker than the aorta, and very loose and flabby in their texture. Its cavity was large. The walls of the left ventricle too were much thinner and softer than natural. And the muscular fibres of the heart generally were pale and brown. The aorta was of a brown

red colour throughout its internal surface, probably from putrefaction. A few slight atheromatous deposits were observed in the descending thoracic aorta. The pulmonary artery was of the same brown-red colour with the aorta. There was but one coronary artery, and, considering the size of the heart, it appeared to be of small dimensions. It with some difficulty admitted a small director. It was slit open to the extent of nearly three inches. Its internal surface was red but healthy with the exception of a slight atheromatous deposit situate about an inch from the orifice of the artery. This however did not appear to diminish its cavity.

“The liver was pale and rather small; the gall bladder was distended with yellow bile; the spleen was very soft and bloody.

“The stomach and intestines were distended with air. The kidneys were soft and rather bloody, and their surface presented in some degree the mottled appearance known by the term ‘Bright’s kidney.’

“The head was not examined. From the absence of all symptoms of disease in the brain to the last moment of existence there was no reason to believe that any thing unhealthy existed in the head.

(Signed) “S. BUCKNILL.
“S. B. BUCKNILL, M.D. } Rugby.
“J. HODGSON, Birmingham.”

But neither did this case present any thing extraordinary in its mere symptoms. Each paroxysm was a genuine paroxysm of angina pectoris and nothing more. But the rapidity with which one paroxysm followed another, and the very brief period between the first which declared the disease and the last which killed, these were indeed extraordinary circumstances.

Here then are three cases of angina pectoris. In the first we have death in a fortnight; in the second death in ten days; in the third death in less than three hours, from the first seizure. Now circumstances cannot be conceived more favourable than those which these three cases present for ascertaining the connection between symptoms declared in the living, and changes of structure found in the dead. The symptoms were essentially the same in all. They were few and striking and constituted of actions and sufferings which manifestly could, and manifestly did, cause death. They were also uncomplicated, no other symptoms interfering to spoil the simplicity of each case, before death arrived.

In the two last of these cases one structure of the heart and one only had undergone morbid change. Its muscular substance was reduced to an extreme degree of tenuity and softness. In the first more than one structure had suffered. Its muscular substance was looser of texture than natural, but was not softened in any greater

degree. Yet, moreover, its coronary arteries were entirely converted into calcareous tubes as far as they could be traced, and so was the whole aorta too. I have no doubt whatever that out of these states of disease arose the fatal angina in each case respectively.

But there is a much larger question which pathologists and physicians wish to settle—It is this. Is there any form of organic disease which can be regarded as the efficient cause of angina pectoris absolutely and at all times; and if so, what is it?

Now let us look a little farther into the disclosures of morbid anatomy, and then, comparing what has been found in cases of longer duration with what we have seen in cases of rapid fatality, try whether we can come at any sure result.

The cases of longer duration are very puzzling in all that respects their morbid anatomy. Alterations of organic form and texture, which are very simple at first, come to be very complex in process of time. This happens especially with the heart. And, when in the heart the organic changes are many and belong to several structures, it becomes hardly possible to know what share we should assign to one, and what we should deny to another, in the production of certain symptoms during life. This happens especially in long-standing cases of angina pectoris. Some part of the complex disease found after death

must (we conceive) have existed from the beginning, and been the efficient cause of the first paroxysm which occurred years ago, and of the last which occurred to-day, and of every paroxysm in the intervening period. But *which* that part is, who can tell without some clue to unravel the matter beyond what the morbid appearances themselves supply?

But in almost all the cases of angina pectoris on record death has been postponed for years, and in almost all, dissection has disclosed very complex disease of the heart and large bloodvessels. The three cases, therefore, which I have reported, become very interesting from their fatal rapidity. And perhaps they may have a further value from their simplicity, if they are found to throw light upon those numerous cases of the same disease, which are all too complex to be understood of themselves.

If in those, who die at a very early period after the first attack of angina pectoris, some one simple change of structure were uniformly found, and if in those, who die at more advanced periods, the changes of structure, though ever so multiform and complex, always included the simple form of organic disease, which belonged to the malady when it is more rapidly fatal, then would angina pectoris be fairly traced home to its efficient cause.

There are no cases upon record in which death

followed the first accessions of angina pectoris so rapidly, as in those three which I have related. And if the disease essentially proceeds from any material element which morbid anatomy can detect, these were the cases in which to find it. You know what *was* found in these cases. Unfortunately for the success of our inquiry, not the same thing in all. Extreme muscular attenuation in two, and muscular attenuation of less degree conjoined with ossified coronary arteries and an ossified aorta in the third. But had there been simple ossification of the coronary arteries in all or simple muscular attenuation in all, yet could neither one nor the other be regarded as the proper efficient cause of angina pectoris. For though one or both are often traceable among the complex forms of disease found in those who die at later periods, yet one and both are often entirely absent.

What then have these cases, so new and interesting in their details, taught us after all? Truly nothing which, upon a comparison with other cases, goes to establish a purely organic or mechanical theory of the disease. But they have taught us much, very much, if, not looking beyond the actions and sufferings of the paroxysm, we regard them as constituting *the* disease. They have taught us that angina pectoris has a greater, an earlier, and more instantaneous power to kill than it was ever hitherto thought to have, and they

have so far enlarged our knowledge of its clinical history, and have thus enabled us perhaps better to understand its real nature.

What then is its real nature? Dr. Heberden, after vast clinical experience of the disease (for he believed that he had seen more than a hundred cases), and after observation enough of it in the living man, reports "that it seems to pertain to *distention* and not at all to inflammation." *

Do not smile at this old-fashioned phraseology of Dr. Heberden or at me for quoting it. The writers of Dr. Heberden's time spoke of "*distention*" without any precise meaning. Not so Dr. Heberden himself; who in this place evidently meant by "*distention*" what we understand by spasm; and by inflammation evidently meant inflammation both in its progress and in its results, and indeed all that we understand by "*Organic Disease*."

Then Dr. Heberden proceeds to give his reasons why angina pectoris "*pertains*" to spasm and not to organic disease, thus:—

1. It comes suddenly and goes suddenly.
2. It has long and complete intermissions.
3. Wine and spirituous drinks and opium afford great relief.
4. It is increased by mental agitation.

* Angina pectoris, quantum adhuc illius naturam intellexi, ad distentionem, non autem ad inflammationem videtur pertinere.

5. It exists for years without other injury of the health.

6. At first it is not excited by exercise in a carriage or on horseback, as is usually the case with scirrhus or inflammation (organic disease).

7. The pulse is not quickened in the very paroxysm.

8. The paroxysm attacks some after their first sleep; a frequent event in diseases which proceed from spasm.*

Surely there is matter of fact and solid sense in all this. Nevertheless it does not prove quite as much as it was thought to prove. Grant that angina not merely pertains to, but is properly and essentially, *spasm*, — spasm does not necessarily exclude organic disease; spasm is a mode of action in muscular structures different from or beyond their natural and accustomed mode. It is in itself a thing essentially vital and has no necessary alliance with material conditions. It may be and often is

* 1. Primo, subito accedit et recedit.

2. Deinde, longas habet et integras remissiones.

3. Tum, non contemnendam opem præbent vinum et potiones meraciores et opium.

4. Tum, perturbatione animi augetur.

5. Tum, multos annos molesta est sine alio valetudinis detrimento.

6. Tum, principio non excitatur vectione in curru aut in equo, ut fieri solet ubi scirrhus aut inflammatio est.

7. Tum, in ipsa accessione pulsus non concitatur.

8. Postremo, nonnullos adoritur post primum somni tempus; quod in morbis ex distensione frequens est.

altogether independent of organic disease. But organic disease may be and often is instrumental in producing it.

We seem here to be touching on the truth. Let us search a little farther in the same direction, and perhaps we shall find it. The paroxysm of angina pectoris is plainly a compound of pain and of something else. Of the pain there can be no doubt. But there needs must be something more than the pain to account for the dying feeling which attends every paroxysm, and for actual death in a paroxysm at last.

“Spasm,” it has been said, “is a mode of action in muscular structures different from, or beyond, the natural and accustomed mode.” The natural actions in all muscles, voluntary and involuntary, are unaccompanied by any conscious sensation whatever. But spasm is always accompanied with pain. And pain and spasm, wherever they are, disable the parts which they befall. Colic stops the peristaltic movements of the bowels. Cramp forbids the hands to handle and the feet to walk.

But the heart is a muscle, and its functions flow from its attributes as a muscle. Now we are in search of something in the heart which, as the concomitant of pain, may be disabling to its natural functions, and capable, according to its degree, of hindering or abolishing them altogether. This we find in spasm. In its spasm of smaller

degree the heart fails to close freely upon the blood and to impel it freely into the arteries. In its spasm of greater degree it fails to project it altogether.

Herein we discern an adequate explanation of the chief phenomena of angina pectoris. It is a spasm of the heart.

Review then the *circumstances* which have been recorded in connection with this disease. Many and various, perplexing and seemingly contradictory, indeed they were. But now they must begin to appear signally illustrative of its nature.

From what we know of pain and spasm, and the things causing and pertaining to them, in other parts of the body, we might be prepared for the same sort of things causing, and pertaining to, them when they belong to the heart. Thus we might expect to find angina pectoris incident to any form of organic disease of the heart, but constant to none. And such is the fact. We might expect to find angina pectoris where there was no organic disease of the heart itself, but such organic disease elsewhere as might injuriously interfere with the functions of the heart. And such is the fact. And finally we might expect to find angina pectoris, where there was no detectible organic disease either of the heart or of other parts, but where itself (namely spasm) constituted the whole disease; a disease purely

vital, a disease of feeling and function alone, operating by and through sound structure, it may be fatally, always perilously. And such is the fact.*

I wish to add a few remarks upon certain mysterious cases of sudden death.

In a previous lecture I noted it among the hindrances of medical experience retarding its growth to perfection, that our observation was largely taken up with mere fragments of cases which do not in themselves contain enough to explain their own nature; and I observed moreover that "a single entire case often furnished the key to many fragments of cases."†

Many cases of sudden death often present themselves as mere fragments to our observation. Individuals are found dead. The mode of their dissolution and the circumstances just preceding it are unknown. And dissection after death does not clear up their mystery. Now some such cases have their nature explained by the very cases of angina pectoris before described, and are shown to hold a pathological kindred with them.

R. P. was about fifty-five years of age. He had filled a high judicial office in India, and, when his stated period of service had expired, he returned home with unimpaired health. Ten

* The fact is not within my own experience; but I must admit what is credibly reported.

† Page 196.

years had wrought little change in his person, except that, from having been thin and muscular, he was slightly tending to fat and corpulency.

He had now been more than a twelve-month in England, and had taken up his residence in Hampshire, and was in the enjoyment of his wonted health, when one day, after a morning's shooting without any extraordinary fatigue or exertion, he felt at dinner an unusual pain in the region of his heart. The pain was not extreme, but enough to make him leave the table and retire into his library. Warm applications were made to the chest, and the pain soon ceased altogether. He then begged that he might be left alone to repose until tea-time. In less than an hour his wife returned into the room, and found him lying upon the sofa just in the position she had left him. She believed him asleep, but found him dead.

The examination of his body, as it was reported to me, disclosed nothing that could account for his death, but a thin fat heart; fat was deposited upon it at the expense of its muscular substance. Here the very manner of the patient's dissolution was not witnessed. The symptom last observed was pain immediately referable to the region of the heart; but it was not of an extreme amount: probably it returned in a more severe degree at the time of dissolution.

Now this case may be fairly interpreted by the

case last described, in which there was a complete observation of all that *vitally* constituted the disease. There all was comprised in pain; pain occurring under the conditions which bespeak spasm, and that of the heart. Here too all that was observed was pain; and it is likely that what was not observed was still nothing else but pain, and that it directly proceeded from spasm of the heart, and that the patient died in the first paroxysm of angina pectoris.

P. W. M. was seventy-three years of age. The whole course of his life had been singularly exempt from illness. For many years he had been employed in a regular routine of duties belonging to a government department. In the course of the few last years he had consulted me three or four times for slight complaints of the stomach, and thus gave me the opportunity of learning that his pulse was habitually very small and very feeble. One winter, when bronchial catarrh was very prevalent, he did not escape the general malady. He was not very ill, but ill enough to make it prudent for him to keep his bed for three or four days, and then for a few days more not to return to business. In little more than a week he was so nearly well that I discontinued my attendance. The last day I saw him he made light of his past illness and ridiculed the care which had been taken of him. At night he retired to rest apparently well, and the next morning was

found dead in his bed, and cold. On examination after death nothing notably wrong was found within the brain, nothing within the lungs, nothing within the pleuræ. The bronchi, to which the symptoms of his past illness belonged, presented nothing remarkable. But the heart was very small in all its dimensions, its muscular substance altogether very thin and very soft without being fat, and both its coronary arteries, as far as they could be traced, were mere bony tubes.

Here the symptoms immediately preceding dissolution were unobserved. It is probable that he died of a first paroxysm of angina pectoris, of a first spasm of the heart.

I was curious to learn whether this gentleman had ever in his life been known to suffer anything approaching to angina pectoris. But I could not find that he had. There was however one remarkable circumstance about him which was probably connected with the feeble structure of his heart. He was strangely averse from bodily exercise. His residence was in the neighbourhood of Russell Square, and his business in the City. But he never would walk to his office, if he could help it. When he was in the country he would be in the open air from morning to night, but never on foot, always on his pony. In all this he might have been unconsciously favouring his feeble heart.

LECTURE XXXVIII.

ANGINA PECTORIS CONTINUED.—ITS CLINICAL HISTORY AND TREATMENT. — CONDITIONS TO BE NOTED IN THE INTERVALS OF ITS PAROXYSMS. — PARALLEL BETWEEN IT AND EPILEPSY RESPECTING THEIR TREATMENT.—MANAGEMENT OF THE PAROXYSM.—WHAT AUSCULTATION TEACHES.—WHAT THE VARIOUS CIRCUMSTANCES OF ITS CLINICAL HISTORY.

THE cases already given offer a striking representation of angina pectoris in what concerns the paroxysm, displaying its essential conditions and its fatal tendency. But they are extraordinary cases. And extraordinary cases are often merely curious, and interesting only because they are curious. But sometimes they are interesting, because they furnish rare and fortunate opportunities of instruction, filling up gaps in our knowledge, or fortifying it with new proofs, and so giving it a higher degree of certainty than it had before. Thus the cases which have been recited seem to carry us a little beyond our former knowledge of angina pectoris.

In the last lecture it was almost taken for granted, that the assemblage of symptoms constituting angina pectoris was to be found by turns

in connection with all forms of unsoundness which belong to the heart. The fact, you may perhaps think, should rather have been verified by an appeal to numerous cases and dissections, especially since it was a good deal relied upon as a basis of our reasoning. But this would have been a long business. Let it then be enough for me now to refer you to a source, where this very fact is authenticated, and where indeed the whole learning of our present subject is set forth with admirable accuracy and comprehensiveness.*

My purpose however is to take what I have myself seen, and to comment upon it as I would upon cases in the hospital. Have I then any thing more to say of the mere paroxysm of angina pectoris? Thus much only; 1st, that in different individuals and in the same individuals at different times the period of its duration is apt to vary. It may come and go and be all over in a minute. Or it may last many minutes, even a quarter of an hour. Or it may be protracted for half an hour or an hour. 2dly, that the two elements (so to speak) of which the paroxysm consists, are apt to vary proportionably to each other. The pain and the dying sensation may be equal in degree, and both may be extreme. Or in different individuals and in the same individuals at different

* Encyclop. of Practical Medicine, Art. Angina Pectoris, by John Forbes, M.D.

times, the one may exceed the other. The dying sensation, however, I have more frequently found to surpass the pain than the pain the dying sensation.

Nothing more need be said of the paroxysm in the way of description at least.

But is not *angina pectoris* a disease altogether of paroxysms; and when we have learnt what the paroxysm is, have we not learnt every thing? Why, no! There still remains its clinical history and all the circumstances prior, predisposing and conducive to it; and these, when we come to its treatment, must engage our attention more, far more, than the paroxysm itself.

For only let us consider, and we shall find this to be the common condition of almost all diseases which consist in distinct and separate paroxysms, namely, that their treatment, whether it aim at postponement or mitigation or absolute cure, is occupied not with the paroxysms themselves but with circumstances which appear in the intervals between them. Take epilepsy for example. In the attack itself our chief care is to protect the patient from injury. I do not know that we either can, or pretend to, do any thing for the mere convulsions. It is when the convulsions are over that we seek for indications to guide our remedies, and that we betake ourselves to the proper business of medical treatment. It is then, that we watch the brain in its habitual and daily

operations both mental and physical; and that we watch too all those organs especially with which the brain holds a more obvious relation of function and sympathy, the heart, the kidneys, the stomach and bowels, and learn whether all is right, or what is wrong, with them. It is then, that we note well the habitual state of the vascular system, whether it be plethoric or anæmic, and of the nervous system, whether it be torpid or excitable. We seek in all these organs and systems of organs for actions or sufferings which may be more or less, nearly or remotely, conducive to the epileptic paroxysm; and whenever and wherever we find them we minister to them. Moreover we are, above all, inquisitive after any notable circumstance, within or without the body, immediately preceding the paroxysm, which can have force to call it forth.

Thus we address ourselves to the treatment of epilepsy. And we address ourselves to the treatment of angina pectoris in like manner.

As to the attack itself of angina pectoris, it is very much more an affair of life and death than is the attack of epilepsy, and so there is more room and more need for our interference with it. But for what purpose is our interference? For the purpose rather of saving life than of treating the disease. For say that we do save the patient's life in the paroxysm of angina pectoris, (a great thing truly to be able to say,) yet when his pa-

roxysm is over, it is not at all less likely to return because we have saved his life for the time being.

The paroxysm indeed has its proper management, which must be considered; but the real treatment of angina pectoris, whether it look to mitigation or postponement, or even contemplate the possibility of cure, concerns itself with things which are to be ascertained leisurely in the intervals between the attacks.

As in epilepsy, so in angina pectoris, we first inquire into the habitual state, as to function and structure, of that organ from which the paroxysm, when it arrives, directly proceeds. We now seek to know all we can about the heart, as we then did about the brain; and next all we can about the bloodvessels immediately springing from the heart: and then about the whole vascular system, whether it be plethoric or anæmic; and then about the nervous system, whether it be torpid or excitable. And the stomach and bowels and their subservient viscera we scrupulously watch. And lastly in angina pectoris, even more than in epilepsy, and more than in any disease of paroxysms, we desire to come at a sure knowledge of the conditions, which in each particular case are apt to call forth the attack, whether they proceed from the body or the mind, or from meats and drinks, from within or without, from things that can be avoided or things that cannot.

Here then is the whole subject put in *working*

form and order. Let us see what we can make of it, when we come to apply our remedies.

First for the paroxysm itself. Now the truth is, we seldom witness the paroxysm. We are summoned; but it has passed away before we arrive, except in some instances of its unusually long duration and great severity. Indeed the patient has almost always either to treat it for himself or trust to whoever may be at hand to help him. The patient then, that is, the person who has once suffered an attack of angina pectoris and is almost sure to suffer it again, the patient himself and those about him must be instructed how to be prepared for it and what to do when it arrives.

The two constituent elements of the paroxysm, the sense of dissolution and the pain, have each their appropriate remedy.

The sense of dissolution calls for those stimulants which take effect in the quickest way, for æther and ammonia. Æther can fetch up life from a deeper prostration than all other stimulants, and therefore it is to be chosen in the greatest extremity. Hoffmann's æther and spiritus ammoniæ should always be within the patient's reach, and, when the attack comes on, a teaspoonful of one or the other or of both together should be given, just so much diluted with water as will allow them to be swallowed. If the paroxysm do not cease the remedy must be repeated in a few minutes.

If it cease and return, the remedy must equally be repeated. And so on again and again, while the threatening of dissolution continues, or while it is going and returning. There is no need of being more explicit. The emergency indeed is great, but its management is plain enough. The simple purpose is to keep life going until the paroxysm is over.

But the other element of the paroxysm, the pain, has, it was said, its appropriate remedy. True; but before its appropriate remedy has time to reach it, the paroxysm and its pain are commonly both gone away together. When however the paroxysm is protracted for a quarter of an hour, or for half an hour, or for a whole hour and more, or when it goes and comes again at brief intervals, then its sharp agonising pain, continuous or recurring, is to be treated *as pain*. And then any other remedy is utterly useless but opium. There is a strength and a prevalency in the pain of angina pectoris which nothing but opium has the power to master. A drachm of laudanum must be given with the æther; and given again in a quarter of an hour, if it have made no impression on the pain; and yet again in another quarter of an hour, if the pain have not yet ceased, or have ceased and returned in all its strength.

And now, when the paroxysm, be it of more or less peril, of longer or shorter duration, treated by

us or treated by the patient himself, is past and gone for the present, our task as physicians is only beginning. For now we must proceed to learn why it ever took place at all, and provide, if possible, that it never shall take place again, or that it shall be mitigated or postponed.

Having witnessed such a formidable assemblage of symptoms, and knowing that they spring from the heart, we betake ourselves at once in every instance to enquire into its condition. We are indeed well aware of the conclusion, justly drawn from a summary of results furnished by numerous cases, that there is no certain form of disease or disorganisation of the heart to which angina pectoris necessarily belongs, but that it is incident to many, if not to all. Nevertheless the form with which it is found in alliance, must be that from which it is derived, in each particular instance. Therefore in each particular instance we should seek to learn what it is; to learn, I mean, during life, so far as by its sounds, its resonances, and its impulses the heart can declare its condition. This knowledge, which comes chiefly from auscultation, may or may not advance our knowledge of angina pectoris absolutely beyond the point where morbid anatomy has left it. What it really does, we shall see presently. It may only assist our treatment of the case in hand. But whether it do so or not, our duty is to ascertain all that is ascertainable for the chance of good which may come, from our

more perfect acquaintance with his case, to every individual patient.

Observe, however, before we proceed further (what it is most important to bear in mind) that in angina pectoris auscultation is not applied to the diagnosis of the disease. The disease is a certain assemblage of symptoms, and not any constant pathological condition belonging to the structure of the organ. Therefore when auscultation detects now this, now that, pathological condition of the heart or of the large bloodvessels in different cases, it does not reach *the disease* but only *circumstances* of the disease. It does not reach its clinical *diagnosis* absolutely, *but* only a part, yet an important part, of its clinical *history* in the individual.

Let me now take the last thirteen cases of angina pectoris which occurred to my observation, and see what it was that I made out, by examination of the chest, in the intervals between the paroxysms.

In three of the thirteen cases, the præcordial region presented the usual extent of resonance to percussion; while the impulse of the heart was most feeble, and not to be felt in the least degree beyond the point where its apex strikes the ribs. Its sounds were perfectly natural in kind, but raised to their highest intonation and diffused over the entire front of the chest, but not conveyed along the aorta. These signs, the defective impulse, the

far spreading and excessive sound and the perfect resonance of the præcordial region, plainly denoted some change of structure in the heart which brings loss of power. They implied simple atrophy and attenuation of its muscular substance.

In other three cases, the præcordial region was altogether dull to percussion; and the imperfect resonance extended as far as the right mamma. The impulse of the heart was very feeble. Its sounds were (as it were) muffled and dull with scarcely a perceptible distinction between the two. They were heard all over the front of the chest and in the left axilla but not at all in the aorta. In one of the cases the beats of the heart were irregular; in the other two they were rhythmical. These signs too denoted some change of structure in the heart which brings loss of power; but it was not *simple* atrophy and attenuation of its muscular substance. Such atrophy and attenuation there might be. But the bulk of the organ was augmented withal; augmented however by the addition of something which was a source of weakness; most probably of fat. The general habit of the patients confirmed the suspicion.

Again, in other three cases the natural sounds of the heart were lost, and changed into (what we have called) endocardial murmurs. These murmurs were very loud, and were heard equally at its apex and its basis, and in all the præcordial

region, and diffused widely over the chest in front, and conveyed along the aorta and the subclavian and the carotid arteries. Thus by their kind, by their extent, and by their direction they sufficiently declared, in all three cases, an unsoundness both of the mitral and of the aortic valves, while by their loudness they showed that the impediment at the orifices was as yet but small. In one of these cases the impulse was very feeble and defective, while the præcordial region was duly resonant to percussion, showing that the heart had lost in power, and probably lost in bulk also, by simple atrophy and attenuation of its muscular substance. In another the impulse was very feeble and defective, while the præcordial region was dull to percussion in an undue extent, showing that the heart had lost in power and gained in bulk, probably by the addition of fat. In the third there was no sign present to denote that the heart had undergone any change of structure beyond unsoundness of the valves.

In the four remaining cases there were unnatural murmurs, but they appertained rather to the bloodvessels than to the heart itself.

In one of them all that could be found was a slight systolic roughness at the commencement of the aorta, present at all times and heard running across the sternum to the right; and, during expiration only, heard running towards the left clavicle, and augmented into a real bellows murmur.

Nothing different from what is natural could be detected in the heart itself. Here there was no sure sign of disease but in the aorta.

In another of them both sounds of the heart in the præcordial region wanted something of being natural, yet fell short of the endocardial murmur. But the murmur became distinct and very loud above the semilunar valves, and still louder in the course of the aorta, and was clearly audible in the subclavian and carotid arteries of both sides. The heart beat with some slight excess of impulse while the præcordial region was duly resonant. Here the only detectible disease was in the aorta. Whether the heart's small excess of impulse was due to a small hypertrophy or to an abiding irritation imparted to it by a near impediment of the circulation, cannot confidently be told.

In another of them no unnatural sound whatever was heard in the præcordial region, but a murmur began to be audible just opposite the semilunar valves, and became louder and louder beneath the sternum in the direction of the right subclavian, and it was still loud in the right carotid; while in the left subclavian and left carotid no murmur whatever was heard. It was distinctly diastolic and systolic by turns. When the pulse was irregular, as it almost constantly was, then the murmur was diastolic; when it was regular, as it sometimes would be for half a minute, then the murmur, for that half minute, would become sys-

toxic. The heart's impulse exceeded neither its natural degree nor extent, but there was some undue measure of dulness to percussion in the præcordial region.

In another of them a very faint endocardial murmur at a small space near the basis of the heart became loud opposite the origin of the aorta, and louder beneath the upper part of the sternum, and loudest of all in the left carotid, where there was no extraordinary impulse; but it was scarcely audible in the right carotid, where the impulse was excessive; very loud in the left brachial, where the impulse was very small, and scarcely audible in the right brachial, where the impulse was very great.

I have preserved no record, in this last case, of the heart's impulse within the chest, or of the resonance or dulness of the præcordial region.

In these two last cases, the auscultatory signs denoted rather disease of the aorta and of certain arteries springing from it than of the heart itself; and moreover they denoted that it was so situated as to make a difference either in the quantity of blood which reached the two sides of the body, or in the force with which it circulated in each respectively.

Thus in each particular case of angina pectoris I have sought (and thus you must seek) to come at the knowledge of what was really wrong at the source of the circulation, if perhaps I might be

enabled to administer more appropriately and effectually to the patient's relief. And after all I hold it but honesty to confess that my clinical labours pushed in this direction have had no such fortunate reward. The details which have just been given are interesting enough, and they could not be spared. But consider what they are, and recollect what has been said in former lectures of these and the like forms of unsoundness in the heart and in the bloodvessels respective to their treatment. The heart that is simply attenuated and the heart that is fat; unsoundness of the sigmoid valve and unsoundness of the mitral; of the aorta and of its branches: these do not, you well know, ask each its own mode of treatment. In truth they none of them admit of any treatment *for* themselves, but only for some of their effects *beyond* themselves.

Thus the light thrown by auscultation upon the assemblage of symptoms constituting this disease called angina pectoris is, as far as it goes, just the same as that which proceeds from morbid anatomy; but it reaches us sooner. For auscultation is the anticipation of morbid anatomy. The one tells us during life what the other waits to tell us after death.

But I say "as far as it goes." True it is, that the light from auscultation in this affection is the same as that from morbid anatomy, and that it reaches us sooner; but *it does not go so far*. For

there are conditions, to which angina pectoris is often annexed, incapable of being surely known until death. Such are certain changes, both pathological and abnormal, of the coronary arteries, disturbing or arresting the current of blood within them.

But beyond the heart, the aorta, and its branches within the chest, we must look to the vascular system everywhere, when we have to do with a case of angina pectoris. And what is it that we are likely to find there? Surely not the first spring of the disease, but something that may minister to the return of the paroxysm, and which consequently may become an indication of treatment with a view to it.

The paroxysm is often put off and its severity mitigated and life prolonged by no means more surely than by keeping the vascular system in a just balance between fulness and emptiness, between rich blood and poor blood. In some constitutions, very happily born, the balance maintains itself; and then there is no need of interference on our part. In the majority it is not exact, yet exact enough for the ordinary purposes of health, but not enough when there is some grave infirmity to be palliated and made tolerable elsewhere. A small habitual deviation on this side or that is readily felt and resented by the heart, when it has undergone some form of unsoundness rendering it obnoxious to spasm.

Thus there have been cases in which my treatment of angina pectoris, in the intervals of the paroxysms, has chiefly turned upon reducing the nutritious and stimulant quality of the patient's diet, abridging his animal food, and denying him wine and fermented drinks altogether. There was one case, and only one, in which I was driven to draw blood even more than once from the arm; an unusual and a hard necessity! There have been more cases, on the other hand, in which the general habit of the patient has made me fearful of withdrawing support, and experience has shown me the need of supplying a well-regulated amount of stimulus in the shape of wine daily. The administration of steel in the intervals of the paroxysms has (I have convinced myself) in some instances been instrumental to their postponement.

Truly a volume might be spoken upon the subject, if one were to enter into the detail of all the indications, which the general vascular system may offer to the observant physician, for the employment of remedies as a safeguard, within all possible limits, against the attacks of this awful disease.

And truly the same may be said of the nervous system, and how it notifies indications of treatment by its various states of disorder; and how it presents itself as an avenue for remedies, which may carry a salutary impression to the heart and withhold it for a time from falling into spasm. Loss of sleep, disturbed sleep, and painful irrita-

tion and troublesome wants, such as frequent micturition, may be among the bad habits of the patient, or they may be induced by his disease, or they may be aggravated by it. At all events they contribute to bring on the paroxysm more frequently and more severely. It is wonderful what a small quantity of opium, administered dexterously upon such indications, will sometimes do in keeping angina pectoris from advancing to a greater degree of suffering, or in bringing it back from a greater to a less.

The following case carries this piece of instruction with it at least. A gentleman had for years been the subject of angina pectoris. He called upon me occasionally. I learnt that hitherto the paroxysm had always come on in the day, and always from some known exciting cause. But now he told me that for two months it had also come on in the night, and independent of any cause which he could discover. The attack was after this manner. He woke in the middle of the night according to his custom, and made water. Thus far he was free from pain. But in ten minutes afterwards he perceived the pain coming on. It soon spread all over the front of his chest and ran on rapidly to an agony. He had taken sulphuric æther in the paroxysm, which gave him present relief, and that was all. I ordered him in addition to the æther a drachm of paregoric on his going to bed every night, and

again on his waking and before he began to move. From that time forth, for more than three months, the nightly paroxysm never returned. Such sometimes are the great effects of (what are thought) the little things of medical practice!

These conditions, which belong to the vascular system and to the nervous system respectively, are for us physicians to observe and to appreciate. But the patient by his own experience finds out unerringly what in himself is the immediately exciting cause of the paroxysm of angina pectoris. Bodily exertion is the most frequent, and the most certain. In the vast majority of cases upon record the first paroxysm has arisen while the man was making some strenuous effort. He was lifting a weight, or he was walking up hill, or he was making way against a high wind, when suddenly pain stabbed him through the chest, and he was ready to drop down dead. But he stopped, and instantly recovered. Both the pain and the death-like feeling ceased at once and altogether, and he was quite well again.

The first paroxysm of angina pectoris, though it may be an affair of a minute only, never failed to carry alarm to the stoutest mind. "A little more, he says, and I had been dead." But weeks and months often pass, and time almost wears out the terror of the first before the second paroxysm arrives. But the second comes at last, and just under the same circumstances as the first. Again

a long interval will often succeed before the third paroxysm takes place under the same circumstances as the first and the second.

In a matter so fearfully interesting to himself the patient soon gets a clear notion of cause and effect. A few such paroxysms read him a severe lesson of instruction; a practical and a profitable lesson however; for he learns the great secret of his own treatment. He learns that there is a point of bodily exertion which he cannot exceed with impunity, and so he becomes perpetually on his guard to keep within it. And thus when the exciting cause of angina pectoris is so plain and the motives for watchfulness are so strong, even as strong as the love of life and the fear of death, and when, above all, a man's circumstances are such as allow him to take as much care of himself as he pleases, many years, even ten or a dozen, have been known to elapse between the first attack and the patient's death.

There may be something peculiar in the kind and degree of bodily exertion which the patient can or cannot bear, as the following case will show. T. N. W. was a specimen of a country gentleman which would seem to belong rather to the past generation than the present. Field sports had been his business, his passion and his pleasure, all he lived and all he cared for, for forty years. He was always on horseback and always in the open air; and, whenever the hounds

were out, it was a lost day with him if he was not out with them. The longest run could even yet no more hurt him than the youngest man in the field. He was now in his sixty-fourth year, when he consulted me for an affection which he had suffered at intervals for five months. It was five months ago, when walking up hill he was seized with a sudden pain at the lower part of the sternum and with a strange deadly sensation besides the pain. He stopped; and immediately he was well again, and able to walk on. From that time forth he could never walk up a hill or use any extraordinary exertion without a return of the same pain and the same deadly sensation. And, finding they never came on spontaneously, he had learnt to be very circumspect not to exceed such bodily efforts as he could bear. He was sure, however, that the exertion needed to produce them was becoming less and less, and he gave me this characteristic proof of the fact. At first he could hunt as well as ever; and indeed so he could still, but then he must take care not to ride "the grey mare." Even now he could gallop any horse he had except "the grey mare." But of late "the grey mare" had been too much for him.

Here was a man, well knowing, from what his own feelings told him, that an excess of bodily exertion might kill him, and ever careful to avoid it, who was yet not afraid to get on horseback

and follow the hounds. The fact was, habit had made him so entirely one with his horse, that all *fair* riding was to him much the same thing as being rocked in an arm-chair. It was only when he found himself upon some hard-mouthed beast, that he felt his energies really called upon.

It is remarkable how men, whose life is threatened by every attack and so in perpetual jeopardy, will often continue to bear the aspect of perfect health for years, and will die at last in some unfortunate paroxysm, before half their friends, who were unacquainted with the secret of their malady, ever knew them to be ill. And thus it was, because angina pectoris is compatible with both the appearance and reality of health in the intervals of the paroxysms, that one good man, whom I knew, fully understanding the nature of his malady and convinced that he might die any moment, contrived, from motives of tenderness to their feelings, to conceal the fact from his wife and family to the last.

Contrasted with such specimens of angina pectoris, showing that a man may live long with this disease and live too in the repute of health, and die of the same and be believed to the last (except by himself the sufferer and those who have seen him suffer, or have otherwise known the fact) to be a sound man by all the world; contrasted with such specimens there are others in which the paroxysms acknowledge the same exciting cause

from the beginning and in which men live long, but they have no long intervals of real or reputed health, and are obliged by hard necessity to adopt the daily caution and conduct of invalids. For they find that less and less of bodily exertion calls forth the paroxysms; that more things must be avoided; that more vigilance is needed; that still in spite of all vigilance the paroxysms become more and more frequent, until at length they seem to arise either independent of any exciting cause at all or of any that is apparent or appreciable.

But bodily exertion is not the only exciting cause of the paroxysm. It is probably the most frequent. And well it is, that it should be so; for it is most within the power of the will to measure and to restrain. But in the same individual there are often more exciting causes than one. Passions and affections of the mind are wont to show their power over the body especially by the manner in which they influence the heart, even the healthy heart; rousing it to tumultuous and irregular action and engendering pain within it. And they show the same more conspicuously by the greater force and frequency with which they actuate the heart in its states of disease. Be its disease what it may, and the modes of disordered action and suffering annexed to it, what they may, the mind by its feelings and its impulses can aggravate them and mul-

tively them. It can do so, and often does, in angina pectoris.

Now the will, I fear, is far less master of the mind than of the body. A man may resolve never to move from his chair, but he cannot resolve never to be angry. Thus many a subject of angina pectoris, who by skilfully measuring and limiting the movements of his body by what he can bear, has been able to abate the frequency and severity of the paroxysms and so to prolong his life for years, has in an unhappy moment been surprised into anger and died at once.

And so I believe that in angina pectoris death has followed mental excitement more frequently than bodily excitement. The latter may indeed be the more potential cause of the paroxysm, but the former it is more difficult to guard against.

Nothing can be more plain and palpable, in the nature of an exciting cause, than are bodily efforts and mental impulses provoking pain and cramp of the heart, when the condition of the organ predisposes to them. Thus a fall or a blow has not more surely been known to kill a man than has a sudden surprise of anger or a sudden movement from his chair.

But there are causes (I mean exciting causes) more from within and less obvious but not less real, which can make the healthy heart flutter and palpitate, and lead the unhealthy heart to any modes of action or suffering which belong to

its present disease. They may lead it to angina, *i.e.* to pain and cramp, and so to death; it may be to sudden death.

Experience is ever at hand to show what a bad stomach and bad digestive organs can do in making the heart beat irregularly, though it be sound of structure all the while. I have known people suffer irregular action of a sound heart all their lives. It has been mitigated occasionally to a great degree. It has been aggravated occasionally to a painful amount. But it has never entirely ceased for any considerable period, because it has arisen from a faulty digestion, which has been at one time better and at another time worse, but has never been remedied altogether. And experience is ever at hand to show, when the heart is unsound of structure, that whether the stomach and digestive organs be good or bad, they must have abundant care bestowed upon them both by the patient and the physician. Every case of unsound heart we meet with still enforces the same lesson, that the appetite must be denied, and meats and drinks scrupulously chosen and scrupulously measured, and evacuations duly obtained, if we would practise the best method of mitigating evils which we cannot cure.

In angina pectoris, whatever be the form of the heart's disorganisation upon which it essentially depends, if life be long spared, experience gradually grows upon the patient and the physician of more

and more conditions conducive to the paroxysm. Sooner or later the one feels and the other knows that it may be excited by the state of the stomach.

Seldom at first can it be imputed to any obvious cause but undue bodily exertion. And seldom still for a considerable period (perhaps for months, perhaps for years) can it be imputed to any thing beside this undue bodily exertion and sudden or strong mental agitation. If the patient be blessed with healthy digestive organs, and, withal, be habitually, from choice or from principle, careful and temperate in his diet, then, though the paroxysm continue to recur from these two causes, it is long before any other than these can be accused of any share in producing it.

But, be the digestive functions ever so vigorous, if the patient be one of the unfortunate many who never knew experimentally what strict temperance means, then a new exciting cause of the paroxysm is soon apparent. Simple repletion is soon found capable of bringing on an attack of angina pectoris. And, should the digestive functions be naturally feeble, and the patient be the victim of habitual and extreme dyspepsia, then much sooner, even almost as soon as the malady declares itself, does the new exciting cause become manifest, and thenceforward the paroxysm is found to proceed as frequently from the stomach as from any other source.

Mere dyspepsia has in some rare instances been

the sole apparent cause conducing to the paroxysm ; and extreme care in meats and drinks has postponed it so successfully and for so long a time as to induce a persuasion that the whole malady was nothing more than an intense sympathy of the heart with a disordered stomach.

The late Dr. Richard Pinchard told me that his uncle, who had suffered unquestionable angina pectoris, made out distinctly that each attack was induced by disorder of the stomach. Hence it became the business of his life to take care of this organ, having before his eyes the frightful penalty he might pay for neglect of it. And he succeeded so well that for years and years he did not suffer a single paroxysm. He might well believe, as he did, that the heart was sound, and that his angina pectoris had been an affair simply of its sympathy with the stomach. But at length he was found dead in his library, and on examination the heart turned out to be large and dilated, and its coronary arteries extensively ossified.

There is yet another circumstance which deserves to be mentioned in the clinical history of angina pectoris, namely, its real or supposed connexion with gout. It needs but small professional intercourse with that class of invalids which is well off in the world, to know what a large space gout occupies in all their speculations concerning their own personal complaints. They who have once had gout themselves or have any hereditary

claim to it, are ready to see it in every thing they suffer, small or great, ailment or disease. And indeed, when they have such patients to deal with, medical men themselves are apt to glide into the popular theory, and to make a great expenditure of colchicum upon diseases which they do not well know what to think of or how to manage.

Sober experience, however, cannot deny that there is some truth in these notions. The question is what and how much truth. And this question I for one will not pretend to settle.

Now, in genuine angina pectoris, I have been asked by patients at my first interview with them, "Don't you think it is gout?" And some have put the question from a mere groundless fancy, and others from something more reasonable.

One who had seen some service in the navy, and was now an admiral, had his first attack of gout at the age of 35 : and for the eight following years he never suffered it again. Then for the next thirteen years he had it very frequently and very severely ; the attacks returning perhaps several times in the same year. He was now in his 56th year. And in this year he experienced his first paroxysm of angina pectoris. The paroxysms, varying in frequency and severity, continued to recur for five years. But from the first paroxysm of angina through the entire space of the five years he had had one attack only of

gout. Now, pray do not ask me to give you the reason for all this. I have no profound piece of Pathology that will help me to account for it from the nature of the two affections. Yet I think I see in the circumstances of the particular case an explanation perhaps sufficient to satisfy common sense.

From the time that the angina first appeared, the patient, who all his days had been a generous liver, submitted implicitly to the most exact and rigid temperance. He ever afterwards drank nothing but water, and ate only the lighter kinds of animal food, and those most sparingly.

This discipline was aimed at the angina; and it succeeded in mitigating and postponing its paroxysm. But cure the angina it did not; and it was never expected to do so. But cure the gout it certainly did, as it might naturally be expected to do. For the very same discipline has oftentimes been known to cure gout, where there has been neither angina nor any other disease to supersede it, and so to claim the credit of being its remedy.

But I have heard of gout and angina pectoris alternating with each other in the same subject; when there has been more of gout, there has been less of angina; and when more of angina, less of gout. This is not an affair of my own observation, but I can well conceive it to have happened. It has probably been in the cases (already alluded

to and said to exist) where the angina has been an affection purely vital, and the heart has suffered pain and spasm, though perfectly sound of structure. That such an angina should germinate from the same root as gout is not unlikely. They might both spring from some inveterate fault of the assimilating processes. As long as this fault was unredressed, one or other or both might continue to exist by a sort of pathological necessity: thus whichever happened to predominate would become for the time a natural substitute or compensation for the other, whether it were gout for angina or angina for gout.

THE END.

LONDON: .
Printed by A. SPOTTISWOODE,
New-Street-Square.

October, 1846.

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PRINTED FOR
MESSRS. LONGMAN, BROWN, GREEN, AND LONGMANS,
LONDON.

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